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CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO

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Bulletin 4037 describes the "Jacksteel" Sharpener. Bulletin 4122 describes our regular No. 5 Sharpener. Bulletin 4039 describes the Leyner Shank and Bit Punch.

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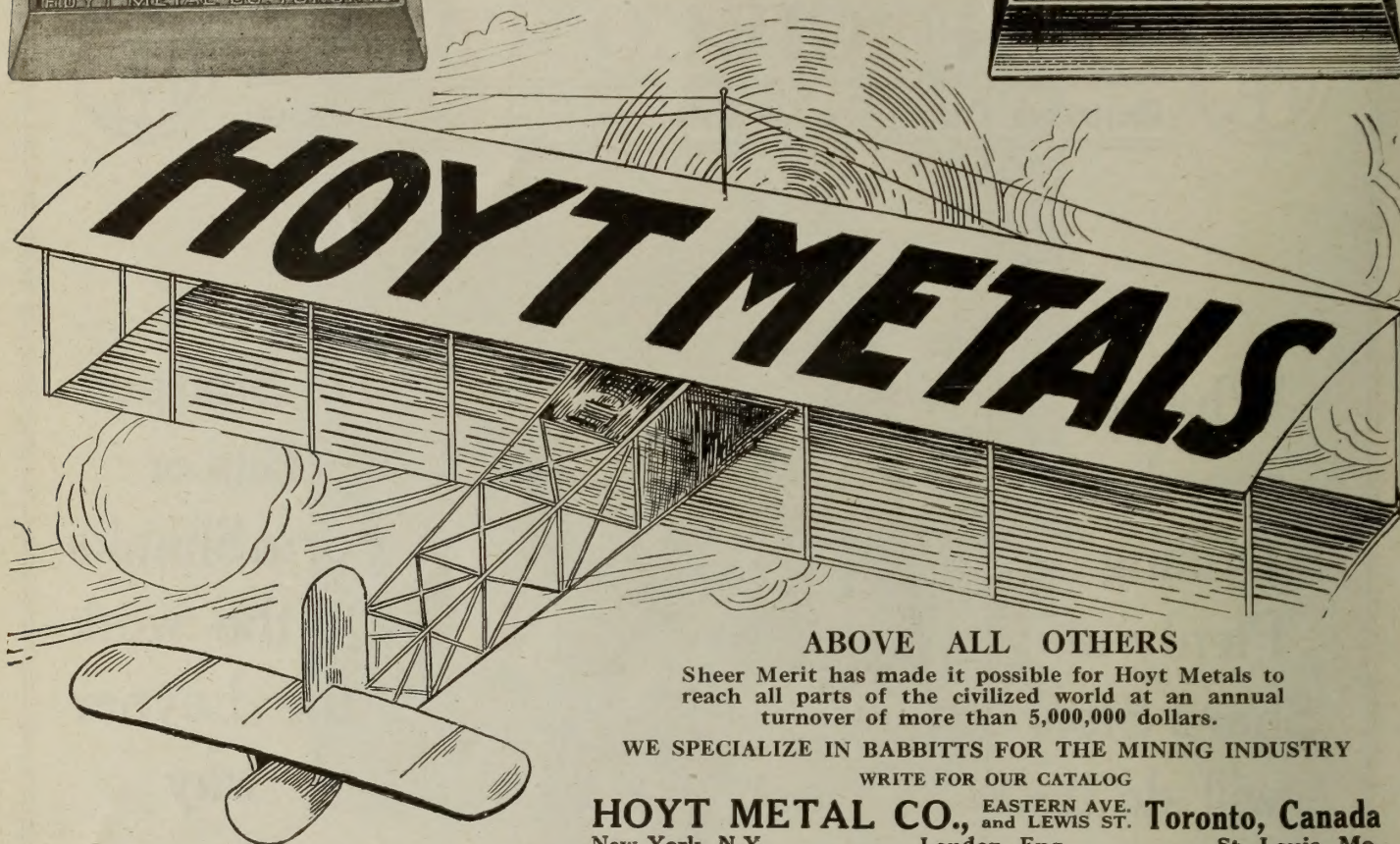
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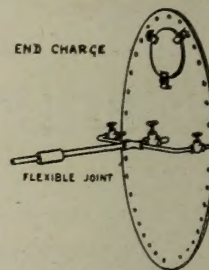
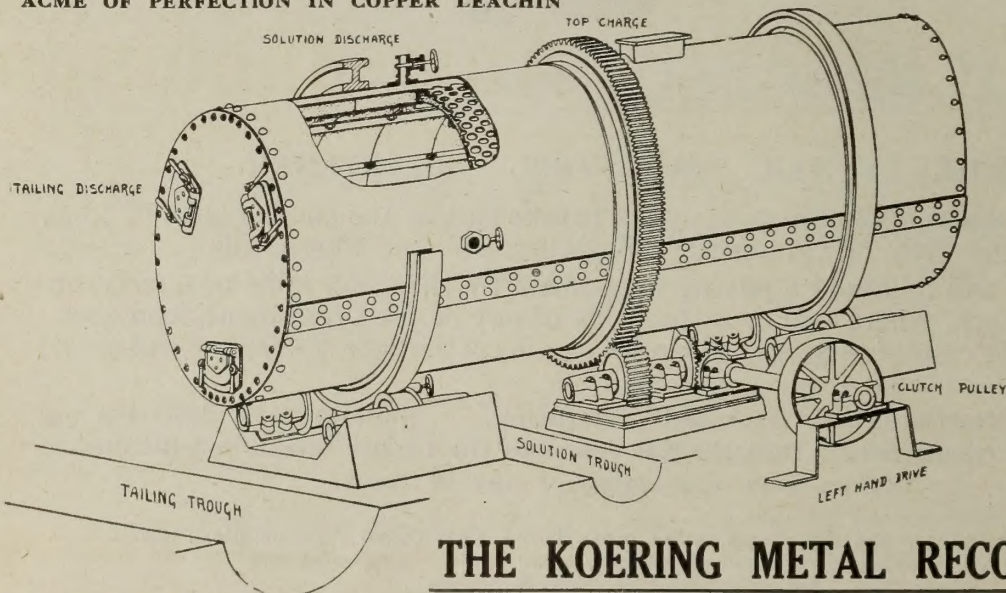
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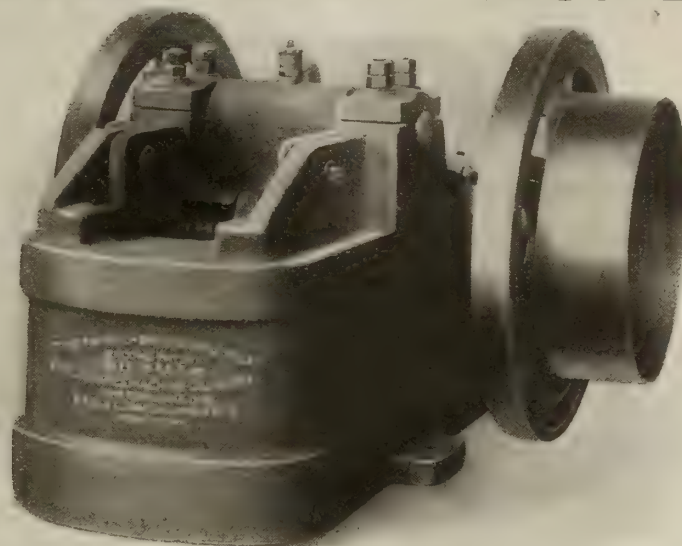
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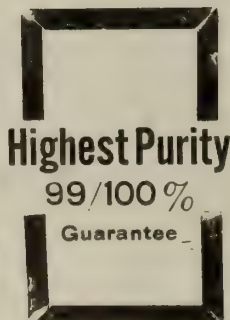
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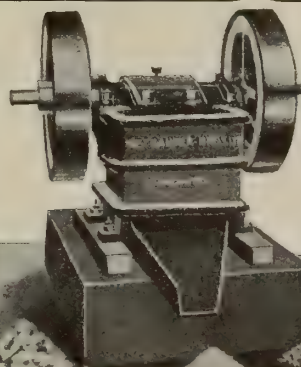
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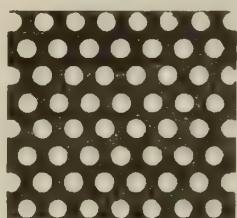
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The Minerals of Nova Scotia

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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

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Commissioner of Public Works and Mines



PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORÉ MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

All applications should be made direct to

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with mining Reports and Maps, may be obtained gratis by addressing

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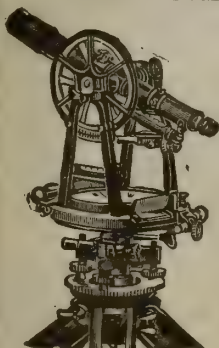
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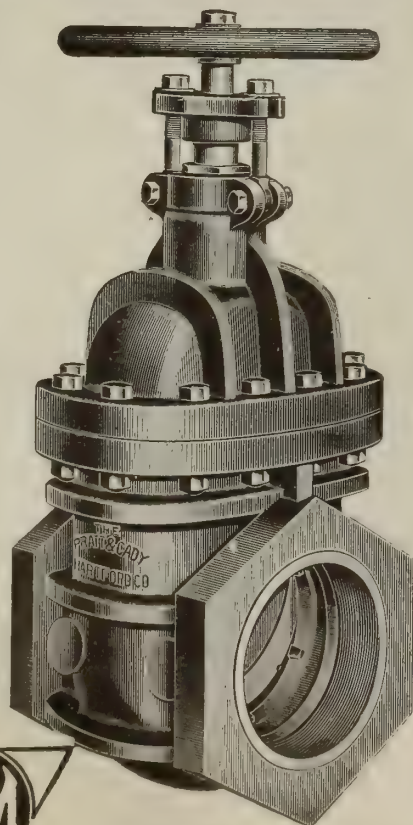
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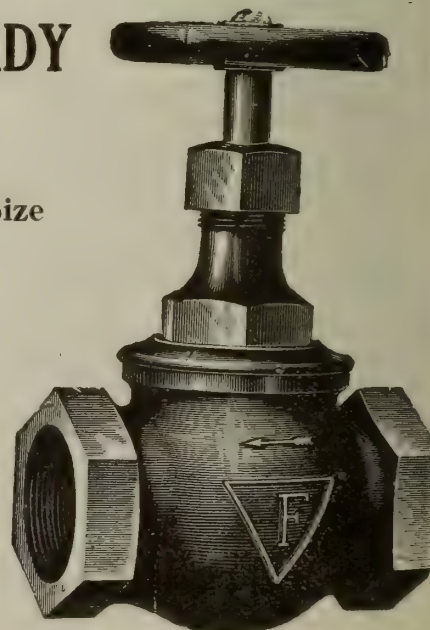
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THE CANADIAN MINING JOURNAL

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FLOTATION PATENTS.

Aside from the suspicion of German control it is questionable whether the Minerals Separation patents are now of any great value in Canada. In our issue of Oct. 15, we pointed out that Canadian laws allow only a reasonable royalty and that the Minerals Separation corporations can hardly expect to be as successful in Canadian courts as in United States courts. We stated that if the American corporation threatens Canadian users of the process with claims for excessive amounts it must be only bluffing. It is provided under Section 44 of the Canadian Patent Act that in case a patentee refuses to grant licenses to others on reasonable terms, anyone may apply to the Commissioner of Patents for a license to make, use or sell the patented invention. As the claims of the Minerals Separation corporation and the conditions under which it issues licenses are unreasonable, it is obvious that Canadian Mining companies have good reason to assume that an application

THE REPORT ON IRON ORE OCCURRENCES.

We have just received from the Department of Mines the first volume of a report on "Iron Ore Occurrences in Canada." The report is a timely one, for there has seldom been so good a demand for iron ore as at present. Many enquiries concerning Canadian deposits are being made, and this description of the principal iron ore mines, few of which are now being worked, will help to answer questions that are being asked. The report was compiled by E. Lindeman and L. L. Bolton. The introductory chapter was written by A. H. A. Robinson.

Unfortunately, there has been great waste in the printing of this report, as in other reports printed in the Government Printing Bureau. Some time ago we referred to the waste of paper in reports of the Mines Branch. In this little book of 90 pages, 30 is pure waste. There is only 60 pages of printed matter and the book is padded out by 30 blank pages. Moreover, some of the photographs, such as III, are so poor that we wonder why they were used at all. Others, such as X, that contain objects of interest have not been properly used. If the useless photographs had been discarded and only those parts of the others that illustrate the text used, there would have been even less than 60 pages needed. Moreover, increased usefulness as well as saving in space would have been obtained by running the illustrations with the text.

THE RESOURCES COMMISSION.

In his letter addressed to the editor of the Bulletin of the Canadian Mining Institute, Mr. Geo. Mackenzie asks a question concerning our criticism of the circular sent out by the Munition Resources Commission.

Mr. Mackenzie wants to know to what end we are making argument. He is entitled to a frank reply and we will endeavor to be brief.

We believe that the work undertaken by the Munition Resources Commission could best be performed by a committee composed of representatives of the Federal and Provincial mining departments and the Canadian Mining Institute. We believe that the Commission, except along certain lines, is out of touch with the work of these departments, is poorly informed concerning our known deposits, and is not the proper organization to gather information. The Commission, if it wishes, might have a representative on a War Minerals Committee, but it should not undertake to itself act as the committee. Mr. Mackenzie would be a valuable man on such a committee, as the representative of the Commission or the Mines Branch. We believe further that we have all the necessary machinery for gathering information concerning our mineral resources and that it decreases rather than increases the efficiency of the machinery to have Commissions, such as the Munition Resources Commission, undertaking to do work which has been or can be better done by the

The Work of the Geological Survey

At the last meeting of the Western Branch of the Canadian Mining Institute, which was held at Princeton, Similkameen, B.C., Mr. Charles Camsell, of the Geological Survey of Canada, said:

"I am pleased to be present at this meeting of the Western Branch of the Canadian Mining Institute, as it gives me a good opportunity to get into touch with mining men who are operating in various parts of the Province of British Columbia.

"The chief function of the Geological Survey of Canada is to assist as much as possible in the development of the material resources of the country, and since it is impossible for Survey officials to visit all parts of the country to determine what is required in the way of survey work, meetings such as this one afford excellent opportunities for acquiring that knowledge, so that we can best adjust and co-ordinate the work of the Survey to meet the needs of the mining industry.

"The territory over which I now have general supervision is very large and comprises, besides unexplored Northern Canada, the whole of British Columbia and Yukon Territory, the increase in responsibility being due to the recent death of Dr. D. D. Cairnes, who had charge of the work in the Yukon, and of Mr. O. E. LeRoy, killed lately in France, who had been in charge of the work in British Columbia. It will be seen, therefore, that under ordinary conditions it is well nigh impossible to keep closely in touch with the requirements of all parts of these extensive regions. I may add that for the time exploration work has been abandoned, but there still remains a large area and much work to be supervised.

"It is my desire to take advantage of this opportunity of outlining to you the amount and character of the work the Geological Survey has been doing, in order to meet certain criticism of our not having done enough, or, again, of having done too much. It must be remembered that our country is very large, while our appropriation for field work is comparatively small, for it is not as large as that of the United States Geological Survey for Alaska alone. But even if we had a larger grant, we could not at the present time use it advantageously, because we have not on the Survey staff a sufficient number of properly trained men. Our losses from death or through enlistment in war service have been high in proportion to the numerical strength of our staff. British Columbia and Yukon Territory have suffered most in these respects, for out of about seven geologists who used to work in this western part of Canada, three have gone to the front (and of these one has been killed), and, within the last year, two others have died. Among the topographers the proportion of enlistments has been even higher. In other parts of the Dominion we have had losses also by enlistments, and since these men cannot at present be replaced, the work of the Survey has had to be curtailed proportionately. It is, therefore, self-evident why we cannot now place as many men in the western field for geological and topographical work as in past years.

"To meet the other objection, namely, that we are doing too much, or not the right kind of work, I ask you to look at the programme of the Survey for last

field, all of whom were engaged in purely economic work, with a view to increasing the production of various kinds of minerals. Some of the members of our staff were doing special work, and others were engaged in making particular investigations in connection with materials required in the conduct of the war. In Eastern Canada investigations were made on deposits of gold, copper, molybdenite, iron ore, magnesite, petroleum, and other minerals. In Manitoba, the new gold and copper fields near the Hudson Bay Railway were examined, and some classification of the land, according to its agricultural value, was made in the northern part of that province. In various parts of the Dominion road materials were classified and mapped. In Alberta and Saskatchewan, gas and coal fields were examined in the southern parts, while in the northern parts work was carried on to determine what are the possibilities for the occurrence there of oil. In British Columbia and Yukon Territory there were six parties, all engaged in purely economic work.

"In several instances results of considerable value to the mining industry have been obtained, which certainly justified the expense of the work. It is gratifying to know that on the whole mining men are very appreciative of the work the officials of the Survey do, and it is their criticism that we do not do enough, probably meaning thereby enough in the parts of the country in which they are particularly interested. They must remember however, that we cannot supply every demand. We have to look at the situation in the light of the needs of the country as a whole, and, accordingly, arrange to do our work where the greatest good will be done to the greatest number of people."

Mr. Camsell then spoke of his own work in the Coast range, of British Columbia, along the line of the Pacific Great Eastern railway. That region had been assumed to be composed entirely of granite, but investigation had shown that on the Pacific Great Eastern section there are several belts of sedimentary rocks running parallel to the range and intruded by granite. The contacts of these belts with the granite are all more or less mineralized, chiefly by copper, and some of them give promise of being found to contain ore deposits of commercial importance. The significant feature of the results obtained along the Pacific Great Eastern railway is that what had been assumed to be a large area of granite nearly one hundred miles wide and several hundred miles long without any mineral deposits of commercial value may be proved to contain several important belts of sedimentary rocks throughout the length of the range in which the conditions necessary for the presence of deposits of gold, copper, silver, lead, zinc, etc., are favorable.

He next drew attention to the great length of coast line bordering the Coast range and which for purposes of transportation is as good as a railway line, and he strongly recommended prospecting along the coast. He also mentioned the necessity for more intensive prospecting along lines of railway where, by reason of favorable location, comparatively low-grade deposits of mineral could be turned to profitable account. In

Another suggestion he made to prospectors was that they should search not only for deposits of metallic minerals, but as well for non-metallic minerals. The latter are too generally overlooked by both prospectors and engineers, but they form a large proportion of the mineral wealth of the country. Such deposits as mica, feldspar, silica, potash, bauxite, magnesite, brick-clays, phosphate-rock, abrasives, cement materials, and various others are all well worth being on the look-out for.

In closing, he expressed his gratification at the progress being made in the development of the copper deposits of Copper Mountain, Similkameen, a progress made in spite of enormous difficulties and due entirely to the faith and persistence of the men in charge of the development work. The future of the Copper Mountain mines now seemed assured. Finally, he expressed his heartfelt thanks to the people of Princeton and surrounding district for their kindly welcome on his return to what had been his field of work for several years.

Dr. W. F. Ferrier, of Toronto, also emphasized the advisability of prospecting for non-metallic minerals, many of which are now in demand for war purposes. He drew particular attention to the possibility of the occurrence of bauxite, a hydrous oxide of alumina, in British Columbia, especially in the Interior Plateau region, where the basaltic rocks, similar to those from the alteration of which the bauxites of some foreign localities have been derived, are widely distributed.

The different forms of this mineral, their composition, modes of occurrence, and uses were described, and some specimens of bauxite were exhibited. Some of the theories advanced regarding its derivation from various types of rocks were briefly outlined.

Attention was also called to the fact that bauxite is used not only as an ore of aluminum and in the production of many chemicals, but also, is in demand for the manufacture of artificial abrasives employed in the finishing of guns, cartridge cases, motors, and other war material.

INTERNATIONAL PETROLEUM COMPANY.

At the annual meeting of the International Petroleum Company, Limited, held at Toronto on Dec. 10th, Walter C. Teagle, owing to his recent election to the Presidency of the Standard Oil Company of New Jersey, retired from the board. The following were elected Directors for the ensuing year: G. H. Smith, Hon. W. J. Hanna, J. L. Englehart, Capt. Henry Keswick, Hon. Wallace Nesbitt, Sir Edmund Osler, C. O. Stillman and A. M. McQueen.

G. H. Smith, formerly Vice-President, was elected President. The Hon. W. J. Hanna and A. M. McQueen were elected Vice-Presidents of the company. J. R. Clarke was appointed Secretary and Treasurer, and H. W. Chapin, Assistant Secretary and Treasurer.

The Directors declared a dividend of fifty cents per share, payable on or before the 31st of January, 1918. Payment of this dividend will be advertised later.

The Granby News, issued for the information of the Granby Consolidated Company's employees in various parts of British Columbia and Alaska, stated in its November number that there were 815 men on the company's Anyox smelter payroll on October 22, exclusive of all office, store, engineering, messhouse

CANADA'S MINERAL RESOURCES.

Some outstanding facts concerning Canada's mineral resources were pointed out by Mr. A. A. Cole, president of the Canadian Mining Institute in an address before the Canadian Club of Montreal some months ago. Mr. Cole said:

"Our coal resources are among the greatest in the world.

"Our asbestos deposits in the Eastern townships of the Province of Quebec supply most of the asbestos of commerce.

"The greatest nickel deposits in the world are located at Sudbury.

"Ontario has the largest body of high grade tale on the continent at Madoc; the largest body of high-grade feldspar on the continent in the Richardson mine near Verona; the greatest mica mine on the continent at Sydenham and the greatest graphite mine at Calabogie.

"During 1916 also a molybdenite property was discovered within 25 miles of Ottawa that bids fair to outstrip all rivals.

"The tar sand deposits of Northern Alberta are the most extensive in the world.

"We also have one of the richest silver camps in the world at Cobalt, and the most promising of the younger gold camps on the continent at Porcupine.

"Our smelters at Deloro and Thorold also produce more refined cobalt than all the other refineries in the world put together.

"These are just a few of the lines on which we lead, but the remainder of our production is by no means insignificant."

The British Columbia correspondent of The Journal writes: "Recently there was published in Provincial newspapers a press despatch from Ottawa stating that 'the collieries in the Crow's Nest Pass district of British Columbia, which are being operated under Government control, are producing 23,000 tons of coal a day, the greatest output in the history of the Province.'" This, the correspondent points out, is a gross misstatement, for the total output of all the coal mines operating in that district for October was only 68,044 tons, and of those of the whole of the Province 230,996 tons. He adds: "Allowing for twenty-six working days, which, however, is probably more than any of the mines worked, the production of all the mines in the Province would have been less than 9,000 tons a day; if they worked an average of twenty days, a total of about 231,000 tons would mean an average of only 11,550 tons a day for the whole of British Columbia, so that it is quite evident the Ottawa correspondent was very far astray."

Northwest Mining Truth, published in Spokane, states that it "understands upon unofficial, though highly credible authority, that examination of the books of the Lucky Jim Zinc Mines, Ltd., has disclosed an alarming over-issue of stock. Just what figure it will reach is not yet known, but there are rumors that it will go as high as 2,000,000 shares. If this should prove true, the very serious position of all stockholders can easily be understood. The authorized capital is \$2,500,000 in \$1 shares, so that a total of 4,500,000 may be in existence at the present time. The question of criminal liability as well as the position of holders of over-issue are matters now giving much concern to

Coal Trade of Nova Scotia During 1917

By F. W. Gray.

In last year's review of the Coal Trade of Nova Scotia the writer stated:

"In a period when the necessity for increased production of raw materials is being preached by the responsible statesmen of every belligerent nation the very considerable diminution in the production of our most important raw material is sufficiently serious, particularly so when the low figures of 1916 follow large recessions in output during the preceding years of 1914 and 1915, but a still more serious aspect is the probability that the tonnages of 1917 will show a further decline, probably to between 5½ and 5¾ million tons, or say, two million tons below the maximum possibility."

This forecast has in the actual event proved only too accurate. The production of coal in Nova Scotia during 1917 has been about 5,735,000 tons, comparing with 6,174,424 in 1916, or has declined a further 440,000 tons below the reduced figures of 1916.

Most unfortunately it is probable that the production of 1918 will decline to a still lower level, say to between 5¼ and 5½ million tons. From present indications it may be expected that 1918 tonnages will show a decline from 1917 figures of possibly 350,000 tons.

An indication of the disappointing trend of production may be obtained from the following table of annual outputs:

Annual Coal Production. of Nova Scotia. (Long Tons)	
1913	7,263,485
1914	6,650,038
1915	6,708,695
1916	6,174,424
1917	5,735,000 (about)
1918	5,400,000 (estimated)

The salient features of the year are those of last year, namely, the large decreases in the production of the larger coal operators, and the number of small operators. At least eight new coal companies have joined the producing ranks in Nova Scotia this year. These operations are small, but in the aggregate they account for 100,000 tons of coal output in 1917.

The activity of the smaller operators is of course a reflex on the high selling price of coal, and is one of the features of an abnormal situation which favors the commencement of new enterprises, as a rule requiring little capital expenditure, but on the other hand presents most serious difficulties to the larger companies, which in many cases have a lean past and an uncertain future outlook.

The enterprise of the smaller operators has aided in the supplying of local needs, and has to that extent relieved the general coal shortage, but the contribution of the smaller companies does not, and cannot to any appreciable degree offset the tremendous decline in the production of the larger operators.

The smaller operators are working on areas that have either been abandoned in times of depression, or even in what we call normal times in Nova Scotia, or areas situated on the outcrops of the main coalfields.

When it is considered—as was stated last year—that taking into account the selling price of coal, the cost of labor and materials, and the margin of profit left to the coal operator, the price of coal in Nova Scotia has never within the past 25 years (up to 1916) been sufficiently high to make coal-mining a reasonably paying investment or to secure the stability of the companies engaged in the mining of coal in this Province, the disappearance of many of the smaller operators from the producing lists may be expected so soon as the present unusual conditions pass away. But the larger companies cannot cease operations at will. They must take the good with the bad, and it is with much anxiety that the larger companies now view the future, and not without reason, as the following summary will show.

By a shortage of labor, the production of coal has been reduced by from 25 to 40 per cent. but no corresponding reduction has been possible in the overhead expenses of transportation, staff, financial burdens, such as interest on bonds and other loans, or in the fixed costs of mining, as pumping, ventilation and general maintenance. The amount of coal available for sale at current favorable prices is reduced by the drop in production, and by the operation of long-term contracts at lower prices than those now prevailing. Increases in wages have been granted more quickly and of greater extent than ever before, and further increases of a most drastic nature are demanded. Costs of all mine materials have increased. The practical cessation of capital expenditure since 1913 is now having its effect on the costs of mining, and the longer these capital expenditures are delayed by lack of labor and difficulty of obtaining materials the more costly will mining operations become. Neither men or materials are at all likely to become plentiful while the war lasts, and for many years after peace is declared the coal production of Nova Scotia will show the result of the period of arrested development through which it is now passing.

Accompanying this combination of adverse factors is the temporary loss of the Montreal market, because in 1917 the shipments to the St. Lawrence did not exceed 50,000 tons. Whether and when this market can be regained is a matter on which predictions cannot be hazarded.

The percentage of coal consumed in the manufacture of iron and steel is again very noticeable. The percentage is increased not only by the large amount of coal used at the steel works, but by the reduction in the total coal production. It would not be a surprising development of present onerous conditions to see some at least of the coal operators of the Province retire entirely from mining coal for general sale, and confine their energies to securing coal for use in metallurgical processes.

It may even be that a logical outcome of the rising costs of coal mining, and the difficulties which will attend the recovery of the lost markets will be a tendency to export manufactured articles from Nova Scotia coalfields in preference to exporting the coal to distant manufacturing centres. It has only been the low costs of freighting in previous years that enabled

Lawrence markets, but the permanently increased costs of extraction and the improbability that freight rates will return to normal as rapidly as they increased to present figures, are factors which will seriously militate against quick recovery of the lost markets.

Cape Breton Island produced 77 per cent. of the provincial total output, which is a falling off from the record of the past six years, during which period Cape Breton maintained a steady proportion of approximately 81 per cent. of the total production. This temporary recession of Cape Breton Island is interesting as a reflex of the large enlistments from the Island, but when industry resumes its normal progress it is quite certain that a steadily increasing percentage of the Nova Scotia coal output will come from Cape Breton Island.

The year has seen an unusual number of political and legislative changes. At the beginning of the year a new Workmen's Compensation Act came into operation, by which administration by a Provincial Board and compensation payments out of a Provincial Fund were substituted for direct payments of compensation from the employer to the injured workman. A schedule of pensions was also substituted for lump sum payments at death. The cost of the assessments made by the Board will amount to probably ten cents per ton on the cost of coal. The legislation has had a disastrous effect on the colliery relief societies. The Nova Scotia Workmen's Compensation Act will in the long run probably prove a beneficial piece of legislation, but unfortunately sufficient attention was not paid by the Legislature to the probable effect upon the relief societies, although the matter was carefully brought to the notice of the Legislature by the representatives of the relief societies.

The enactment of weekly pays became operative in May. This innovation has certainly not increased the production of coal, but it has definitely increased the cost of coal. The effect on one coal company has been an addition of \$20,000 to the annual expenditure for clerical help and stationery, and the employment of 25 additional clerks. The legislation may be considered in line with modern ideas, but some consideration might have been given to the fact that the country is at war, and that the net result of weekly pays has been to reduce the production of coal, to increase its cost, and to increase the number of clerical employees, at a time when coal is scarce and dear, and men are needed for fighting and for actual production of materials.

The year was unfortunately marked by a mine explosion at New Waterford by which 65 men lost their lives. This incident has already been fully described in previous issues of the Journal, and need not be here dealt with in detail. As an outcome, however, of the verdict of the Coroner's Jury, indictments were brought in by a Grand Jury charging manslaughter against the Superintendent and Manager of Dominion No. 12 Colliery, and against the Deputy Inspector of Mines for the Waterford District. So far as is known there is no precedent for this sequence of events, and the position of the Deputy Inspector of Mines is particularly significant, as it has hitherto been assumed that this official was a representative of the Provincial Department of Mines, reporting to the Inspector of Mines. Mine managers and colliery officials, holding certificates of competency from the Department of Mines, have hitherto regarded themselves as responsible for the

Inspector of Mines and his Deputy Inspectors, and have not considered these officials as jointly responsible for the conduct of mining operations with the colliery officials.

It has not been usual for criminal proceedings to be instituted in connection with the responsibility for mining accidents without the intervention of the department of the Government charged with the oversight of the mining laws, or without some specific breach of the Coal Mines Regulation Act had taken place. The disturbing feature in the present incident is that criminal proceedings were instituted after a Commission of Enquiry under the chairmanship of the Inspector of Mines had found itself unable to assign blame, and so far no specific breach of any section of the Coal Mines Regulation Act had been charged.

One curious fact may be noted. The genesis of the explosion was a shot fired under conditions that caused the disaster. That much may be admitted without the necessity to particularize further. There is no regulation in the Nova Scotia C. M. R. A. governing the use of explosives in coal mines, except a series of regulations contained in the "Special Rules" of the Dominion Coal Company, which by compliance with certain rules as to posting and approval by the Inspector of Mines, have the force of the Act so far as the workmen of the Dominion Coal Company are concerned. It can scarcely be maintained under these circumstances that the operators of the Province have been lacking in a desire to improve the mining practice, when as a matter of fact the C. M. R. A. has been supplemented and improved by the careful formulation of rules that are the result of much thought, and incidentally of large expenditures.

The trial of the colliery officials who have been indicted will attract a great deal of attention in Nova Scotia, and the matter is one which should be followed by all mining officials in Canada as it has a most important bearing on the status of the profession. It has also a grave bearing on the technical progress of mining, as if the procedure which has been followed in Cape Breton becomes a precedent, and criminal proceedings commence to follow upon mining accidents without the intervention of the Departments of Mines, or those authorities charged with the regulation of mines, it will kill all individual responsibility and initiative among mining officials, who will either prefer to take no chances of any kind, or will seek professions which offer equal or greater remuneration with less onerous risks.

MINING CORPORATION PAYS \$1,556,296.

By an unfortunate typographical error the Mining Corporation of Canada was credited, in an item published in our last number, with paying dividends amounting to \$1,556 in 1917. The company distributed in dividends during 1917 \$1,556,296.

Two or three new coal mines have been opened recently on Vancouver Island, B. C. One of them is situated at Nenoose, a few miles north of Nanaimo. Its output of coal in November was 4,303 tons, bringing its total up to 22,872 long tons. While this is but small in comparison with the production of the large mines on the Island, it is an encouraging beginning.

FLOTATION-PATENT LITIGATION

An interesting article by R. C. Canby, on the Status of Flotation-Patent Litigation in the United States, appeared in the Dec. 1 number of "The Engineering and Mining Journal." Mr. Canby said in part:

It is unfortunate for the clearness of the situation that the majority opinion of the United States Circuit Court of Appeals, in Philadelphia, in the case of Minerals Separation vs. Miami Copper Co., was technically for the plaintiff, whereas, in actual point of fact, it was in favor of the Miami Company, in that it indicates that its present milling operations are not infringing the flotation patents of Minerals Separation. The opinion referred to was based upon a review of the record in the hearing before Judge Bradford in the United States District Court in Wilmington, Delaware.

The alleged infringing acts complained of by Minerals Separation, in its bill of complaint, occurred in experimental flotation tests carried on before the time that the Miami Company had introduced flotation into its actual commercial operation.

An important difference between the Hyde case and the Miami case should be particularly noted. In the Hyde case the flotation operations under consideration had been carried on in a machine having mechanical agitators or beaters, whereas in the Miami case the concentrating operations were performed in the Callow cell, an apparatus in which the necessary aeration is obtained absolutely independent of any agitation.

It was of the greatest help to the Court of Appeals in Philadelphia to have before it the Supreme Court decision in its consideration of the Miami case. This Supreme Court decision had been considered by Minerals Separation as a tremendous victory. But when applied to the bubble-column mode of flotation, such as takes place in the Callow porous-bottom cell, the decision is most embarrassing to the contention which Minerals Separation tried, unsuccessfully, to sustain.

The opinion of the United States Court of Appeals in the majority opinion of Judge Woolley, and particularly in its minority opinion, by Judge Buffington, is really in favor of the Miami, since the infringing features specified in Judge Woolley's opinion, although having been in the experimental plant, do not constitute a part of the operating plant of the Miami Company, except as stated. When the Court of Appeals opinion is applied to the actual concentrating plant of the Miami Company, none of the infringing features is found.

This article ought to make it clear that the broad claims that Minerals Separation is making to practically the whole flotation field have not yet been sustained by the courts.

In the presentation of its case, in the Miami trial, Minerals Separation laid no little stress upon the "acquiescence" indicated by the fact that the Inspiration, at first under its original contract, and subsequently under the Anaconda contract and supplemental agreement, pays royalty on the tonnage of all of the mill units, regardless of the type of machine.

It might appear, if one went into it, that there was "good business" in this Anaconda contract. One of the Anaconda subsidiaries, the Inspiration, was already under an irrevocable contract to pay the regular Minerals Separation royalty, so, as was brought out in the cross-examination in the Miami suit, it was not only partially a form of insurance, but may well have been

worth \$300,000 to release this subsidiary company from its existing Minerals Separation contract, for the benefit of the lower royalty of the sliding scale of the Anaconda "supplementary agreement."

The Anaconda contract and supplementary agreement may be criticized from many angles, but one cannot but notice that its "acquiescence" is dependent solely upon the Supreme Court's "final decision" in the Hyde case, rather than upon any subsequent decision of the Supreme Court affecting the patents at issue. But, if one considers all of the conditions involved, it certainly lessens materially the force of the Anaconda contract as an instance of "acquiescence."

I mention this matter of acquiescence somewhat at length, because such acquiescence has considerable weight, not only with the court to whom it is addressed, but more especially with the mining public as a whole. The mining public should pause and find just where it stands. It should consider what danger there is of doing an injustice, on the one hand, or of too readily acquiescing in an injustice to itself, on the other hand.

The Supreme Court of the United States had found a novel degree of agitation, greater than theretofore known, which produced a permanence of froth, of a character not theretofore known, and the use of a critical amount of oil. There was no testimony in the Hyde record to show that greater quantities of oil than the "critical" amount could be used successfully in the actual mill. It would now appear that the Supreme Court was misled by this record, since numerous plants are successfully using oil far in excess of the minute quantity characteristic of the claimed process, and slightly in excess of the limit named by the patent, one per cent.

In the most recent litigation, the Butte & Superior case, argued before the United States district court at Butte, Mont., one finds Minerals Separation taking again an entirely new and different attitude. Confronted as it now is by so many actual metallurgical operations in which oil in excess of 1% was being successfully used, it took precisely the position which its opponents had always argued in every prior case, and which Minerals Separation has denied in every prior case; namely, that "oil" used in any excess over that "which is attached to the metalliferous content of the concentrates" is "wasted," "unutilized," "and might just as well flow down the outside of the machine." This is the exact opposite to what Minerals Separation attorneys argued before the Supreme Court, in the Hyde case, and absolutely contrary to the contention upon which the Supreme Court sustained the patent and found the efficacy of the "critical quantity" of oil.

Flotation Takes Place in Modified Water.

In litigation certain assumptions of theories as to the underlying causes of flotation have been advanced by one side or the other, as, for example, in the Miami case, the moving-picture film of bubble-holder experiments in the Wilmington court, by the plaintiff, with the object of showing a different degree of attachment of air bubbles for sulphide with large amounts and minimum amounts of oil. The Miami company contended that flotation takes place in "modified water;" that is, water having a contaminant which reduces its surface tension, with the idea of illustrating that all of the various prior-art processes, as well as that of the patent in suit, No. 835,120, were fundamentally identical, all being dependent upon the same underlying principle; that it is the modifying of the

surface tension that is necessary, and that, having added sufficient contaminant to modify the surface tension, any excess, more or less, of the contaminant or modifying agent, is immaterial, apart from the question of economy.

I have been greatly impressed by the fact that since the Miami case was argued in Wilmington a number of papers have been written by professors and instructors in our technical schools discussing the underlying principles of flotation. These papers were prepared in the laboratories of the technical schools, the authors being unbiased by any particular interest and untrammelled by the necessity of sustaining a particular theory, and yet none of these writers has found the "critical quantity" of oil. At the hearing of the Butte & Superior case before the district court in Butte, several testified as to their methods of investigation, and reproduced their demonstrations before the court.

The quotations from the testimony of experts or the arguments of counsel, while enlightening, are not so important, now that we have the opinions of the United States Supreme Court and the United States circuit court of appeals as a guide. The decision of the Supreme Court, which is based upon the record in the Hyde case, absolutely limits the Minerals Separation flotation process to what is generally known as the agitation froth process, having "an agitation greater than and different from that which had been resorted to before," and a "resulting froth concentrate so different from the product of other processes." The decisions of the United States circuit court of appeals in Philadelphia, both majority and minority opinions, would unquestionably place any partly mechanical violent-agitation froth process, with less than 1 % of oil, within the scope of the patents.

When, however, one comes to the bubble-column form of flotation apparatus, with which 17 out of 18 units of the Inspiration mill, as well as a large number of other American flotation plants, are operated, a different proposition is presented.

Bubble-Column Machines Are Claimed to Be Without the Scope of the M. S. Patents.

These bubble-column machines, the Callow-type machine, the Inspiration-type machine, etc., are not agitation froth machines, and therefore do not come within the scope of any of the patents, Nos. 835,120, 962,678 and 1,099,699, as these patents were defined by the United States circuit court of appeals in Philadelphia in the Miami decision or as No. 835,120 was defined by the United States Supreme Court in the Hyde case. When these decisions in their relation to the bubble-column operations, such as the Callow cell, for example, are considered, the question becomes solely whether the result produced in the porous-bottom cell is the effect of agitation. I consider that it has been established that this is not the case, and that such a porous-bottom, bubble-column cell itself, therefore, operates entirely outside of the scope of these patents.

No sentences could be more clearly worded to state emphatically that the operation of the Callow cell is not the agitation of the patents in suit than those in the majority opinion of the court, as written by Judge Woolley and already quoted. In writing the minority opinion of the court, Judge Buffington says, in conclusion:

"I would hold that the step of the process 'agitating the mixture until the oil-coated mineral matter forms into a froth,' meant the novel air-entraining

agitation which the patentees disclose, and did not cover the novel air-releasing agitation which the defendants disclose."

Moreover, Judge Woolley says, in the majority opinion of the court:

"But in the process we are considering, and upon which the decree we are reviewing was based, the Callow cells were not the whole process, but were merely the last of four distinct parts of the process, the other three being the process of the patent or its fair equivalent."

This is an absolutely clear statement that it was "the other three" parts of the process, the centrifugal pump, the "break in the circuit" and the Pachuea tank, and not the Callow cells, the fourth step, which were "the process of the patent or its fair equivalent."

Looking back to the time of the supposed "discovery" of the process set forth in patent No. 835,120, it will be noted that the disclosures in the flotation art were already too numerous to admit of anything really basic being claimed.

I feel that the legal situation also has been cleared by the decisions of the United States Supreme Court and the United States court of appeals in Philadelphia, so that there should now be nothing to retard further the development of flotation along the lines so successfully pursued by our American engineers in bubble-column flotation.

The Butte and Superior Decision.

Since writing the foregoing, Judge Bourquin has handed down (Aug. 25, 1917) the opinion of the United States district court at Butte, Mont., in the Butte & Superior case. Because of the fact that the method of operating, which has been considered by Judge Bourquin and upon which his decision is based, is so entirely different from the method of porous-bottom cell, Judge Bourquin's decision has absolutely no bearing whatever upon the porous-bottom cell method of operation.

Judge Bourquin may have been completely confused by the plaintiff's new line of argument. What he says as to "self-agitation," agitation by the air particles "in merely rising through the mass," is in absolute conflict with the distinction made by the court of appeals in Philadelphia, and is actually nothing less than the reinstatement of the original claim 12, which was properly denied patentability by the United States Patent Office, and subsequently abandoned by the patentees themselves. The porous-bottom cell method of operation was not before Judge Bourquin, so he may not, therefore, have so fully realized the distinction between the two methods of aeration as would otherwise have been the case. He certainly could not have been conscious of how much the specious arguments of the plaintiff's counsel induced him actually to read into the patent, nor to what extent he was thereby placing his opinion in absolute conflict with the court of appeals in the Miami case.

There are unfortunately also many among the mining public who do not fully understand the legal distinction which exists between the violent-agitation froth method and the porous-bottom cell method of flotation, and who may not realize that Judge Bourquin's decision has no reference whatever to the latter, and thereby may be led to further misunderstanding of the real situation through the unwarrantedly wide scope claimed for Judge Bourquin's opinion by certain correspondents in financial and other journals.

CANADIAN IRON ORE MINES

By A. H. A. Robinson.

Discovery of iron ore in Canada is recorded as early as 1667; and in 1733 there was already one forge in operation. This earliest plant was succeeded in 1737 by a group of forges at Three Rivers, Quebec, which remained in active operation almost continuously until 1882, being at that time the oldest active iron producers in America. A number of other small plants were erected at various points in Canada during the latter part of the eighteenth and the earlier part of the nineteenth centuries; but the iron industry did not assume any large proportions, or commence to take on its modern form until 1896. Since then its growth has been rapid.

In the earlier days, when the iron industry was small, sufficient ore was available locally to meet all the demands of the furnaces. Since 1896, however, this condition of affairs has changed; both the production of iron ore and its consumption in blast furnaces have increased; but the latter so much more rapidly than the former that in 1916 the total production of iron ore in Canada was only equal to 15.5 per cent. of the total ore smelted in Canadian blast furnaces.

Practically all the imported ore comes either from Wabana, Newfoundland, or from the Lake Superior iron ranges in the United States. It might be noted in passing, however, that the word "imported" has not the same significance as applied in the two cases. The Wabana ore, on which the Nova Scotian iron and steel industry is based, comes from a sister British colony, and is owned and mined by Canadian companies for use in their own furnaces; on the other hand, the Lake Superior ores are owned and mined by United States interests, and are bought on the open market by the Ontario smelters.

At present almost all the Canadian ore produced is the output of two mines, the Magpie and the Helen. Both are situated in the Michipicoten district, in Ontario, and both are owned and operated by the Algoma Steel Corporation of Sault Ste. Marie, Ontario.

In any consideration of Canada's iron ore resources, a point that should not be lost sight of, is that the total area comprised in the Dominion is very large, and that much of it is practically unexplored so far as its iron ore possibilities are concerned. With very few exceptions, all the known occurrences are situated in the older and more or less settled and known districts. In the comparatively unexplored regions of the north, large areas of iron bearing rocks occur at a number of points, but, on account of their inaccessible location there is, at the present time, little to induce a thorough exploration of them in a search for ore bodies.

A summary review of the iron ore situation in the different provinces follows:

British Columbia.

Up to the present the production of iron ore in British Columbia has been an almost negligible quantity. The total recorded from 1886 to 1903, both years inclusive, was only 62,578 tons; since 1903 the only production recorded was in 1907, when 2,500 tons were shipped.

Most of the ore—practically all magnetite—was sent to Irondale, Washington, U.S.A., where it was used in the production of pig-iron in a small charcoal blast furnace. The balance went to lead smelters to be used as flux.

The small production of British Columbia has been due, not so much to the lack of iron ore deposits, as to the lack of a market for the ore. In the absence of a local iron smelting industry, there has been no particular incentive either to develop the known ore-bodies, or to search for new ones.

The different varieties of iron ore found in British Columbia include magnetites, hematites, limonite or bog ores, and clay ironstones. The most important of the known ore bodies are a series of magnetite deposits which occur on the islands along the coast in the western part of the province.

Alberta, Saskatchewan and Manitoba.

Up to the present time, no iron ore deposits of such size and quality as to make them of commercial value have been found in the Middle West provinces. There are, however, very large areas unprospected in all three, in which iron ores may be discovered in the future.

Several writers have drawn attention to the fact, that a steel plant located in western Alberta would have essentially the same location with reference to coal-fields and transportation routes as the Colorado Fuel and Iron Company's plant at Pueblo, Colorado. The favorable situation with respect to the coal-fields and the growing industrial market of the prairie provinces should, therefore, make the discovery of even a moderately good iron ore deposit in this district, or in the adjoining portions of eastern British Columbia, a matter of more than ordinary importance.

Ontario.

Previous to 1889, all the ore mined in the province, with the exception of such small quantities as were used in the earlier attempts at iron smelting, was exported to the United States. From 1889 to 1895, both years inclusive, production ceased entirely. About 1896, a system of bounties inaugurated by the Federal and Provincial Governments to encourage the manufacture of iron and steel from native ores, had the desired effect of stimulating the industry, and the following years witnessed the erection of blast furnaces at various points in the province: at Hamilton in 1895; at Deseronto in 1898; at Midland in 1899; at Sault Ste. Marie in 1904; and at Port Arthur in 1907. Strenuous efforts were made to use Ontario ores as far as possible and thus obtain the advantage of the liberal bounties offered; iron mining took on a new lease of life, and prospecting for iron ores became general.

In eastern Ontario old mines were re-opened, and for a time ore was shipped in small quantities. Unfortunately the quality of most of it was poor, and cobbing had to be resorted to, to rid it of sulphur and other deleterious ingredients, and bring it up to merchantable grade. As a result these mines have again, one by one, lapsed into idleness.

In northwestern Ontario, the discovery, in 1899, of the deposit of brown hematite that later developed into the Helen mine, together with the fact that throughout this part of the province there are widespread outcrops of banded jaspers, magnetites, and hematites, of the same geological formations as the Vermilion and Mesabi iron ranges in Minnesota, led to feverish activity in the search for iron ore. Very large sums of money were spent in looking for new deposits and in the exploration of the known ones. The net results of these efforts have been disappointing; we have, it is true, the Josephine mine (still undeveloped); Atikokan, with its high sulphur ores; the Magpie, Helen and other siderite bodies; and a variety of the lower grade, siliceous deposits of banded iron formation. But the only

large body, both high grade and of good quality, yet discovered in Ontario, is that at the Helen mines.

Quebec.

Iron ore was first mined and smelted in the Province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers, in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and at Drummondville, the last to shut down being the Drummondville furnace in 1911. The ores used were bog ores, with charcoal for fuel. The output of all the furnaces was small, and the industry derived its chief importance from the superior quality of the pig-iron made.

Furnaces have also been built at various times and places in attempts to smelt some of the other classes of ore found in the province, but all were short-lived, and none of them achieved commercial success.

New Brunswick.

New Brunswick, like all the other provinces in Eastern Canada, except Prince Edward Island, had in early days its small local iron industry based on local ores.

Between 1848 and 1884, about 70,000 tons of hematite, obtained from deposits in the neighborhood, were smelted in a small furnace near Woodstock, in Carleton County. The deposits were very shallow and the iron content of the ore low.

Some limonite from small deposits at Manguerville, a few miles southeast of Fredericton, was also smelted in the same furnace.

As a producer of iron ores, however, the province has never been prolific. From 1889 to 1909 no output is recorded; from 1910 to 1916, shipments to the extent of 202,850 tons were made, all from one mine.

The only known deposits that have any economic interest are those found near Austin Brook, in Gloucester County, about 23 miles southwest of the Town of Bathurst, and known as the Bathurst mines. They consist of fine-grained, siliceous magnetite, with which is intermixed some hematite.

Nova Scotia.

While next to Ontario, Nova Scotia has to its credit the largest aggregate output of iron ore of any province of the Dominion, the total tonnage from the earliest days to the present would not last a large modern plant very many years (in 1915, 840,394 tons of Newfoundland ore was used in Nova Scotia blast furnaces). Latterly, with the exhaustion of the workable deposits of better-grade ore, production has declined until now it has reached the vanishing point. The extensive development of the Wabana iron ore field in Newfoundland, and the ease and cheapness with which Nova Scotian furnaces can secure a supply of suitable ore from that source, have also operated to decrease interest in the development of local supplies.

A BARITE MILL AT PREMIER-LANGMUIR MINE.

At the Premier-Langmuir barite mine in the township of Langmuir, east of Porcupine, a 30-ton mill for the treatment of the barite is nearing completion. We may look for a production from this deposit in the near future. Considerable work has been done on the vein which is 4 ft. to 6 ft. in width and along one wall is argentiferous. Lack of a method of recovering the silver explains why this property was not on a producing basis 4 or 5 years ago.

HOW MINING BENEFITS THE COUNTRY.

Mining is one of our basic industries and it enters more or less into the lives of every one of us. You do not need to be a stockholder in a mine to be financially interested in its development. Take, for instance, the little camp of Cobalt. Of course, a camp to be successful must make profits. Cobalt does that, and the result is the dividends that are paid. If you are a shareholder, that is what you are most interested in. But let us look at Cobalt from another angle, that of a non-shareholder. It costs seven million dollars annually to run the Cobalt mines. After careful enquiry I am convinced that most of the seven million dollars eventually finds its way down to Toronto and Montreal. If you are a merchant or a manufacturer, does not a matter of an extra few millions annually coming into the city interest you? Remember that Cobalt is only one of a number of flourishing mining camps up North. —A. A. COLE.

DEEP EXPLORATION FOR NICKEL ORE.

A most interesting piece of exploratory work is in progress in the Sudbury nickel region, where diamond drilling prospecting is being carried on by the Mond Nickel Co. lot 2, concession I, township of Creighton. The Creighton mine, operated by the Canadian Copper Co., is situated on lot 10, concession I, Snider. The ore body dips northwesterly at an angle of about 45 degrees and it is hoped the drills will encounter ore at a depth of about 3,800 feet. Three holes are being put down on the north part of lot 2, near the boundary line between lots 1 and 2. Reference to the Creighton mine geological map which accompanied the report of the Royal Ontario Nickel Commission will make the situation clear. If this daring and expensive piece of prospecting is crowned with success development of the ore body will involve sinking a very deep shaft, comparable to those of the Rand or Keweenaw Point.

Mr. James Gray, at present manager for a coal mining company operating in Tasmania, expects to return to British Columbia next March. Several years ago he was manager of the Nicola Valley Coal and Coke Co.'s Middlesboro colliery, near Merritt, Nicola Valley, and afterwards for two years, of the No. 7 mine of the Comox colliery, Vancouver Island, owned and operated by the Canadian Collieries (Dunsmuir) Limited.

Mr. K. C. Laylander, of Hydraulic, Quesnel river, Cariboo district of British Columbia, expects to shortly leave for the Eastern States to meet the directors of the Quesnelle Hydraulic Gold Mining Company, with a view to expansion of the company's work in the Quesnel mining division, of which he is in charge. He states that he lately uncovered an immense deposit of black sand, running high in value, and it is with the object of making arrangements for the development of that deposit that he is arranging to go East. The leading men in the Quesnelle Hydraulic Gold Mining Co. are resident in either Pittsburg, or Philadelphia, Pennsylvania.

Many friends in Canada of Mr. A. B. W. Hodges, of Los Angeles, California, formerly for some years in local charge of the Granby Consolidated Company's mining and smelting enterprises in the Boundary district of British Columbia, will be interested to know that he is a member of the Sulphur Committee of the War Industries Board of the United States, which was pursuing its duties in Texas early last month.

FLOTATION AT COBALT, ONT.

Mr. W. E. Simpson, of Cobalt, has an interesting article in the Dec. 3 number of "Mining and Scientific Press" on flotation of Cobalt silver ore. He says in part:

Flotation has proved a useful auxiliary in the treatment of silver ores, and is now in operation at practically every producing mine in the Cobalt district. Mines originally equipped with plants for gravity concentration have bettered their recovery as much as 5 to 15 per cent. through the addition of flotation units, while the added cost is from 5 to 15 cents per ton. With the all-sliming process (grinding in cyanide solution), extensive experiments indicate that when recovering the refractory minerals by flotation, the usual revenue is maintained or improved, and that the consumption of cyanide is reduced one-third. The chief difficulty with flotation lies in the disposal of the concentrate, marketing to distant smelters being expensive and local treatment not yet having proved satisfactory. Threatened litigation by Minerals Separation, Ltd., is also seriously embarrassing metallurgical progress in the Cobalt district.

The earliest application of the flotation process to the treatment of silver ores at Cobalt dates from 1910, when some small-scale tests were made in the laboratory at the Coniagas mine, to note the effect, if any, of violently shaking representative samples of mill-pulp to which had been added a few drops of oil. No commercial importance was attached to the results obtained in these simple experiments and the matter remained in abeyance so far as that mine was concerned until quite recently.

The next attempt was made in 1914, when a former employee of the Minerals Separation Company constructed an experimental unit at the Temiskaming mine and demonstrated the feasibility of profitably treating the fine tailing, then being run from the concentrating mill to the waste-pile. The litigation ensuing over the use of flotation acted as a deterrent to the continuance of experiments.

While these tests were being conducted, a sample of slime, representative of what may be now called flotation-feed, was sent by the Cobalt Reduction Company to its consulting engineer in London to determine whether the flotation process could be introduced successfully in the Cobalt district. The tests were made in the laboratory of Sulman & Picard, metallurgists for Mineral Separation, Ltd., and the results were as follows: The sample assayed 5.5 oz. silver per ton, and the products obtained were a concentrate assaying 43.5 oz. containing 57.11 per cent. of the silver in 7.3 per cent. of the weight of the original slime, a final tailing assaying 1.99 oz per ton with 24.88 per cent. of the gross content left in 69.15 per cent. by weight of the slime, and a middling containing the rest. Alf. Tellman, who signed the report, concluded by saying: "I believe that if the slime can be successfully treated by cyanide, you will be able to make more profits than with flotation."

The serious adaptation of the flotation process to the Cobalt ores really started when T. R. Jones, manager of the Buffalo Mines, after conducting an extensive experimental campaign, installed the first treatment plant to operate on a commercial scale in October, 1915. This unit employed the Callow type of machine and had a capacity of from 50 to 75 tons per day. So satisfactory were the results that

additional plant was immediately erected, bringing the total capacity to 600 tons per day in September, 1916.

The first flush of success led to the statement by enthusiastic operators that flotation would entirely replace the gravity method of concentration, completely displace the cyanidation of Cobalt ores, and revolutionize the established practice of metallurgy. Further experience, however, has called for a modification of these views. A satisfactory recovery of the silver-bearing minerals by flotation is only obtainable from material in a fine state of subdivision, and the tendency now is to apply the process to the treatment of slime and to such portions of tailing as may be sufficiently rich to warrant the additional expense of fine grinding.

Applicability of Flotation—In reaching a decision regarding the adoption of a process and the installation of a plant, two factors exert an influence in favor of flotation at Cobalt more than in mining districts generally; these are (1) the winter is long and heating is costly, and (2) many of the mines appear to have already passed the zenith of their prosperity, their ore-reserves being now narrowly limited in extent. The most desirable process for the Cobalt mines therefore is one that can be housed in the smallest building and installed with the lowest capital outlay. Experience has proved that a flotation plant can be erected in a space less than one-fourth that required for either a group of gravity-tables or a cyanide-plant of equal capacity. In a modern mill for treating 100 tons per day it is estimated that a saving in capital expenditure of about \$20,000 can be effected by the substitution of the new for either of the older methods. The working profit also favors the newer method. The chief handicap to flotation is its inability to produce a finished article, that is, one easily marketable, such as high-grade bullion. Flotation in reality is a method for concentrating valuable mineral into small bulk, the ratio of the weight of material treated to that of the product being, in the Cobalt district, approximately between 50 and 100 to 1. This concentrate either must be treated locally or sold to distant smelters, whereas if cyanide bullion is produced no further treatment is necessary.

The litigation, with which the Cobalt district is being threatened, prohibits the publication of authoritative details for fear that they may be used subsequently in law-court proceedings. It may be stated, however, that, as a general rule, the recovery varies from 75 to 90% of the silver in the material treated by flotation and the cost of the actual operations from the time of receiving the slimed feed to that of discharging the finished concentrate is roughly 20c. per ton.

Minerals Separation.—In harmony with its attitude elsewhere, the Minerals Separation Company, through its subsidiary organization, the North American Corporation, has threatened proceedings against all users of flotation in the Cobalt district, so as to collect, if possible, the royalty of 2 1-2 per cent. of the gross value of the whole concentrate recovered, according to the usual demands of this patent-exploiting company. The success of flotation at Cobalt is due entirely to local enterprise, therefore this demand is resented bitterly. The indications are that a legal fight is to follow, and a campaign has been started to enlist Government action "with a view to having the patents annulled." Amid the legal turmoil, metallurgical progress is being seriously handicapped, the

free exchange of ideas has been completely stopped, and an embargo is being placed on valuable information. It is sincerely hoped that an equitable settlement may be obtained at the earliest possible moment.

Flotation is undoubtedly destined to play a part in all milling operations in the Cobalt district, although its scope will not be as extensive as was at first anticipated. As a competitor to the sand-table it has not met with the success gained in other localities for the reason that the valuable minerals are difficult to float and are easily recoverable by gravity-methods. For successful flotation, the arsenic, nickel, and cobalt minerals, with which much of the silver is associated, must be reduced to a fine state of subdivision in order to conform to some flotation law in which the ratio of surface-area to mass is an important factor. Fine crushing is expensive; consequently the best field for flotation lies in the treatment of primary slime. On this material, it has already completely superseded the slime-table, the additional revenue being greatly in excess of any additional cost incurred. One concentrating plant treating 150 tons of ore per day has been able to add to its recovery from 200 to 300 oz. of silver in concentrate daily, the additional revenue being directly attributable to the introduction of flotation for the treatment of slime. The approved type of gravity mill for Cobalt, therefore, should contain jigs for the extraction of the coarse metallic silver, gravity tables for the treatment of sand, and flotation for the slime.

MAGNESITE FOR FURNACE LINING.

Lately the Quebec magnesite industry has taken an important step forward. The two principal operators, the North American Magnesite Company, and the Scottish Canadian Magnesite Company, are now making dead-burned magnesite, containing a suitable percentage of iron, for furnace lining. The magnesite is being burned in the cement kilns of the Canada Cement Company, at Longue Point, near Montreal, and at Hull, near Ottawa. The product is very satisfactory and widely used. The North American Magnesite Company has obtained a lease on a promising property in Harrington township, and a gang of men is at work mining magnesite and storing it, awaiting winter roads to haul it to the railway.

Recently there was published in The Daily Colonist, of Victoria, B. C., some information along the lines of editorial comment made in this Journal on December 1 relative to the proposal that printing of the publications of the Canada Department of Mines be stopped. Writing to that newspaper, a resident of Victoria bore testimony to the value of at least one of the Geological Survey reports, information obtained from which, he stated, had led him to prospect in a part of Vancouver Island within forty miles of Victoria, with the result that he discovered copper ore and located mineral claims, the development of which has been undertaken by a prominent mining engineer who is known to be acting for mining men of wide connections and good standing in the United States. He gives his experience as a striking demonstration of the value of at least one of the departmental reports, and adds that "an ounce of fact is worth a ton of theory," especially as there is promise of a productive mine being the eventual outcome of his having read the Geological Survey report to which he referred.

OBITUARY.

On November 9 the news was published at Trail, British Columbia, that Major Kenneth Burpee Carruthers had met his death while serving his country in France. Major Carruthers was for ten years in the employ of the Consolidated Mining and Smelting Company, at its mines at Rossland, at Moyie and Kimberley in East Kootenay, and still later at its Molly Gibson mine in Nelson mining division. He was a graduate of McGill University and of the Royal Military College, Kingston. Shortly after his enlistment for active service he was made a captain of heavy artillery; and was officer commanding the 29th Field Battery, C. E. F. He had served between two and three years in France, in which country a brother was also killed. His age was about 36 years, and his death is widely regretted in the Kootenay districts of British Columbia, in which he had many friends.

Mr. Grant B. Schley, president of the Howe Sound Company, of New York, the holding company of the Britannia Mining and Smelting Company, operating in British Columbia, died at the age of 70 years at his home at Far Hills, New Jersey, on November 22, after a comparatively short illness. The Daily Province, of Vancouver, B.C., states that although his health had not been what might be called robust, it was not expected that his death was so near. Two months ago he had a serious setback, but his recovery was confidently looked for, so that his death was a surprise to many of his friends. It was in 1904 that the late Mr. Schley commenced to take a keen interest in mining in British Columbia, and, after lengthy negotiations, he secured control of what is now the Britannia Mining and Smelting Co., the property of which near Howe Sound, in Vancouver mining division, has since been developed into one of the large copper mines of Canada. The Province states, further, that during the time he has been connected with it, Mr. Schley has invested between \$7,000,000 and \$8,000,000 in the property, and the fact that its mining and concentrating operations are now on such an extensive scale, as compared with those of days gone by, is due in large measure to his foresight and energy.

The death occurred at Nelson, B.C., on November 19, of Professor Arthur Lakes, the well-known geologist and writer, at the age of 75 years. He was born in England, where he received his education. While still a young man he went to the United States, where, says the Nelson Daily News, he finally took up the study of geology and practical mining. Afterward he was a professor of geology in the University of Colorado. He had been, for many years, a frequent contributor to mining journals and other publications. For several years before his death he had resided in Nelson.

COST ACCOUNTING FOR OIL PRODUCERS

The U. S. Bureau of Mines, Department of the Interior, has recently issued Bulletin No. 158, on "Cost Accounting for Oil Producers," by Clarence G. Smith. This is the first treatise of its kind and is a simple explanation of the methods that may be employed in cost accounting for oil producers, who, on account of the peculiar and unusual conditions affecting oil production, require a much different system of cost accounting than any other class of business men.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

As the year nears its close there seems to be good reason to think that there will be a considerable decrease in the value of the mineral production for 1917 as compared with that for 1916. One estimate published placed the probable total at about \$40,000,000, as compared with \$42,290,000 for 1916, but this was stated to be conditional upon an early resumption of operations at the smelting works and refineries at Trail and the production of ore at the mines that ship to Trail, which conditions, however, have not been fulfilled. Under the circumstances, then, it is unlikely the 1917 total value of mineral production will be nearly as large as that of the year immediately preceding. Without having gone into much detail to make a reliable estimate, the opinion may be given in a general way that while there may be an increase in total value of placer gold, and possibly of zinc, the decrease in value of other metals will be much larger than such suggested increase. Further, it is unlikely that the total output of coal has been any larger in 1917 than in 1916; in fact, the figures available at the beginning of December made it appear that there would probably be a small decrease in the year's gross production of coal as compared with 1916.

There had not been a settlement of labor troubles at Trail by the middle of December, so far as had been made known in Provincial newspapers, but Mr. W. H. Armstrong, of Vancouver, B. C., who earlier in the year had been given the duty of getting the coal mines of Alberta and Southeastern British Columbia into operation after a long suspension of work, has been at Trail endeavoring to bring about an agreement between the striking employees and the Consolidated Mining and Smelting Company. Perhaps before these notes shall have been printed he will have succeeded, but at the time of writing neither party to the dispute appears to be showing any sign of yielding. Besides Mr. Armstrong, there are Mr. McNiven, Dominion fair wage officer, and some officials of the International Union of Mine and Smeltermen engaged in negotiations looking to an agreement.

The closing of the Trail smeltery to receipt of ores from Slocan and other mines has necessitated efforts being made to find another market for them. District newspapers have reported that there is a possibility of arrangements being made for shipment of ores to United States smelting works, and in this connection it is stated that arrangements have been entered into between the Canadian Pacific and American railways for a joint freight rate on silver-lead ores from British Columbia mines to smelteries in the United States.

West Kootenay.

Ainsworth.—The Kootenaiian, Kaslo, states that the suspension of operations at the concentrating works at Kaslo has still further increased the number of unemployed men there.

Announcement has been made that the Utica Mining Co. is to acquire the Bell and Sunset mines for a consideration of \$70,000 in cash and \$800,000 in shares in the Utica company. The Utica mine is situated near the head of Twelve-mile creek in the western part of Ainsworth mining division. The Bell is in Jackson basin, about eight miles south of Whitewater, near the boundary line between Ainsworth and Slocan divisions, while the Sunset is on the mountains forming the

divide between those divisions. Both Bell and Sunset mines have been producers in past years, the former largely of zinc ore and the latter of high-grade silver-lead ore. They are neighboring properties at the head of Jackson basin.

Slocan.—While there has been but little ore shipped from Slocan mines since the suspension of work at the Trail smelting works, other than zinc concentrate from the Standard Silver-Lead Mining Co.'s concentrator at Silverton under its contract with a zinc smeltery at Bartlesville, Oklahoma, U. S. A., few mines have yet completely stopped work as a result of the labor difficulties at Trail.

Near Sandon, the Slocan Star is hampered by lack of money to pay for necessary development work, comparatively heavy liabilities having been incurred to provide additional milling facilities, better water supply for the concentrating mill, aerial tramway, etc., without first having developed sufficient ore to keep things going in such a way as to meet payments when due. The shareholders in the company are now asked to pay an assessment on their shares to tide over the present financial difficulty; meanwhile operations have been stopped.

In connection with the Lucky Jim Zinc Mines, Ltd., it is stated that the former manager, Mr. G. Weaver Loper, has surrendered possession of \$150,000 in bonds he held as security for alleged advances to the company, but no definite action, so far as has been made public, has been taken in regard to the stated large over-issue of shares in the company. The closing of district concentrating plants at which Lucky Jim ore was made marketable and of the Trail smeltery to which shipments were being made, have for the time interfered with the progress the receiver was making toward clearing off liabilities to various creditors of the company.

A different condition of affairs is claimed for the Rambler-Cariboo Mines, Ltd., operating on the other side of the mountain from the Lucky Jim mine. A report published in Spokane, where is situated the head office of the company, follows: Promising conditions have been developed on the fifth and ninth levels of the Rambler-Cariboo mine, according to a report received from the mine, in Slocan district of British Columbia. It is believed important ore resources will be developed on those levels. The concentrating mill has been operated, working only one shift a day since the interruption, of ore shipments following the suspension of smelting at Trail. A fairly large quantity of crude and concentrated ore has been accumulated at the Rambler-Cariboo mill. It is probable, though, that it will be found desirable to stop production at the mine for a while. It is estimated that the company's surplus at the end of November was \$32,000.

Other Slocan notes are that work has been stopped at the Ivanhoe, a small property, near Sandon. Development of the Noble Five group is being continued. Mr. Bruce White, manager of the Noonday Mines, Ltd., reports the outlook for the Noonday mine as satisfactory except that shipment of ore is not at present practicable. The Surprise Mining Co., operating successfully the Surprise mine above Cody and the concentrator just below Sandon, has some forty men at work on the old Bosun property, between New Denver and Silverton, Slocan lake, which mine was a comparatively important producer some years ago until much zinc ore was encountered and a market for it could not then be found. The several properties including the Queen

Bess and Van-Roi, that for some months have been operated by Mr. Clarence Cunningham for himself and associates, are in good shape for maintaining production as soon as buyers can be obtained for their silver-lead ores, and the Hewitt group, in Silverton camp, the last property to be taken over by that syndicate, is stated to have much silver ore of a good grade available for extraction whenever conditions shall be favorable for its being shipped profitably. Other mines in the district are also being operated.

Nelson.—There is little mining news of importance from this division at present. The Daily News, Nelson, has of late given scarcely any information relative to mining in the division, so it seems fair to assume that for the time not much is being done. The chief shipper in recent months up to the time of the closing of the smelting works at Trail in the middle of October was the Emerald lead-ore mine, in the neighborhood of Salmo, where the outlook has been increasingly favorable for maintaining a considerable output of ore. It was stated several months ago that shipment of gold-silver ore was to be resumed from the Yankee Girl mine, near Ymir, with a Boundary district smelting works as its destination, but no information in this connection has been made public in quite recent weeks.

Rossland.—Similarly, no news of Rossland mines is being made public. Only four mines were being worked in the camp when the Trail trouble arose, namely, the Centre Star group, Le Roi, and White Bear, by the Consolidated Mining and Smelting Co., and the Josie group, by the Le Roi No. 2 Ltd. A report from Grand Forks is to the effect that there is a possibility of the Le Roi No. 2 company shipping ore from its Josie group to the Granby Consolidated Co.'s smeltery at Grand Forks, but no definite information as to this has yet been made public.

Boundary.

Early in November The Ledge, published at Greenwood, stated that the Canada Copper Corporation had that week shipped three carloads of copper to New Jersey and had two other carloads awaiting shipment; also, that a second blast furnace at the local smeltery was to be blown in and would be run a short time. For some time past the company had been shipping its blister copper to Trail to be refined at the Consolidated Company's electrolytic refinery, but on the closing of the latter company's works other arrangements had to be made for refining it.

Shipment of ore from the Union mine, in Franklin camp, some fifty miles north of Grand Forks, has been stopped for the winter. Ore from this small mine has been sent to the Granby Company's smeltery during the months when hauling could be done from the mine to the rail-head at Lynch creek, but now that snow has fallen the running of motor trucks can not be continued except under difficulty. A short time ago it was stated that the owners of the Union property were endeavoring to arrange to put in concentrating plant so as to be able also to use some of the lower grade ore occurring in their mine.

Similkameen.

News from Camp Hedley is to the effect that recently there was quite an influx of miners and shovellers, so that the Hedley Gold Mining Company now has an adequate supply of labor at its Nickel Plate group of

According to the Similkameen Star, of Princeton, about 150 miners are now employed at the Canada Copper Corporation's mines on Copper Mountain, twelve miles from Princeton. It is stated, further, that the miners there are paid on the bonus system, and that they earn about \$5.20 a day.

From twelve to fifteen men have lately been employed at the coal mine near Coalmont, taking out coal and getting the mine into shape for being operated again. Some coal is being shipped to Vancouver. The property is now controlled by a syndicate of Vancouver men, including Mr. R. S. Lennie, Mr. Blake Wilson, and others.

PERSONAL AND GENERAL

Mr. J. A. Dresser, of Montreal, and Mr. H. E. T. Haultain of Toronto have been nominated as vice-presidents of the Canadian Mining Institute to succeed Mr. Chas. Fergie and Mr. T. W. Gibson.

A meeting of the Toronto Branch of the Canadian Mining Institute was held on Saturday, Dec. 8, at the Engineers Club. The speakers were President A. A. Cole, of Cobalt, Mr. D. B. Dowling of the Geological Survey, Ottawa, and Mr. John Stirling, Inspector of Mines of Alberta.

Mr. W. R. Wilson, of Fernie, B. C., general manager for the Crow's Nest Pass Coal Company, recently paid a business visit to the Coast districts of Washington and British Columbia.

Mr. George L. Fraser, for the last two years in charge of surface operations at the big copper mine of the Granby Consolidated Company at Hidden Creek, near Observatory Inlet, B.C., is now in charge of development work on the coal lands on Vancouver Island the company has acquired. It is stated that Mr. J. W. Powell, who several years ago was mine manager under Mr. Fraser at the International Coal and Coke Company's mines near Coleman, Alberta, has resigned as superintendent for a coal mining company operating in Kentucky, to take a similar position with the Granby Company on Vancouver Island.

The Victoria, B. C., office of the Ladysmith Smelting Corporation, has been closed, and an office opened by that company in Seattle. Mr. W. J. Watson, resident representative of the Tyee Copper Company, is again manager of the smelting works at Ladysmith, and Mr. Geoffrey B. Kitto has resumed his former position of superintendent.

Mr. E. G. Montgomery, of Rossland, B. C., superintendent of the Consolidated Mining and Smelting Company's Centre Star group of mines, has been examining mining property in Camp Hedley, Similkameen district.

Mining and Scientific Press states that Mr. James G. Parmalee, research metallurgist for the Granby Consolidated M. S. and P. Co. at Anyox, B.C., has accepted a fellowship in metallurgy at the University of Idaho, Moscow, Idaho, in connection with the United States Bureau of Mines.

A report from Telkwa, in Omineca mining division, British Columbia, states that men working on the Cassiar Crown Copper Company's property on Grouse Mountain, in that neighborhood, have sent in to Telkwa word that they have run into five feet of clean ore. The company has its headquarters at Spokane, Wash.

MINERALS SEPARATION PATENTS

In the matter of the Minerals Separation controversy which began in Cobalt, Sept. 10, and which has since spread to all parts of the continent, there is at present a lull. The matter is now receiving the attention of the patent office of the Department of Agriculture. The mine operators have submitted evidence which they believe sufficient to convict the M.S.N.A. Corporation of being under German influence, while the M.S.N.A. Corporation officials have furnished the department with evidence which they claim will clear them of the charges made.

In a free country such as Canada, an individual who makes a discovery which is patentable, is entitled to protection. If the idea is of commercial value, the revenue rightly belongs to the inventor. This is what encourages inventive genius. Yet, that is precisely what the M.S.N.A. Corporation is endeavoring to rob the world of. The proof is this: Any one who subscribes to the license of the M.S.N.A. Corporation thereby enters into a binding contract to not only pay the prescribed terms of royalty, but also to hand over to the licensors all improvements, additions and modifications which may be patentable, and such to automatically become the property of the M.S.N.A. Corporation.

The M. S. N. A. Corporation owns certain patents pertaining to the recovery of mineral from ore by use of the flotation process. Other concerns such as Elmore, and Callow own somewhat similar patents. However, the M.S.N.A. Corporation appears to think all others than their own are infringements. Granting, for the moment and only for simplifying discussion, that this last named corporation does own the rights to the process and that all others are infringers, then the Corporation is entitled to royalty from anyone who wishes to use the process. If the terms of royalty are excessive and tend to burden the mining industry it is for the Government to step in and protect the industry. In arriving at this conclusion however, we also arrive at another. The Corporation can license what it controls but cannot by any stretch of imagination lay claim to any discovery, addition, modification, or improvement made by other individuals while using the process. Because Tom invented a pump he cannot accuse Dick and Harry of infringing when they invent a wind-mill.

In support of their scheming paragraph 3, the M.S.N.A. Corporation has drawn up paragraphs 5 and 6 wherein it is pointed out that anyone who once becomes their licensee must not while using the process nor any time after a discontinuance of the contract dispute or even object to the validity of the M.S. patents. It is doubtful if this latter attempt to silence mining men and metallurgists could be legally enforced, but any one who should be compelled to subscribe to the present form of license would feel more or less bound in honor to live up to the conditions outlined.

Thus, it is plainly up to the Government to first investigate the charges of German control; secondly, to find out what would be reasonable terms of royalty;

The writer has been informed by a gentleman who has for several years been in the service of the M.S.N.A. Corporation, that of all the ideas reported to that corporation by their licensees, in no case has the licensee received any material sum for the discovery, or discoveries.

Another matter which stands out as a possible menace to the progress of metallurgy, and which would tend to indicate that possibly an attempt is being made to evade the patent laws of the country in which they operate, is this: By taking out patents for improvements, additions and modifications, a portion or perhaps all of which are the results of the intellect of their (M. S. N. A. Corporation) licensees, that corporation is constantly coming into possession of a veritable sheaf of legal documents which will possibly be held as a weapon, for many years to come, over the science of flotation. Under cover of meaningless, but confusing legal wrangle the patents of 1916 might well be employed as a means of carrying the monopoly on for another dozen years or more. By the end of that time, if such practice were not squelched, there is no telling but that new and later patents would be taken out which would again carry the monopoly forward for another term of years.

A sense of common justice will bid the Government to free the mining industry from the shackles of the existing monopoly. Accredited representatives of the Government deliberately fix the price of wheat, of potatoes, of coal, and of copper, and now contemplate the fixing of the price of silver. They should not hesitate to fix reasonable terms of royalty for use of a process, which is of great benefit to the mining industry and which is being held at exorbitant ransom to any one who wishes to use it.

As stated not long ago, the fruits of the intellectual energy directed along this one particular highway of science should be the reward of the discoverer. Screened behind the shield of science which has ever shrouded the inner workings of the M. S. N. A. Corporation, may be considerable intellect or may be profound ignorance in wily retreat feasting upon the brains of the world. The M. S. N. A. Corporation, whether bursting with energy or wallowing in a slough of inertia, by the enforcing of its license in its present form would have an endless chain of useful ideas flowing to its bosom, and to be held at exorbitant ransom to the very men through whose combined energy the complete idea was evolved.

It is from that menace the mining men and metallurgists of Canada demand protection. The writer is not speaking without authority in stating the mine managers, as a body, of the largest precious metal mining camp in the Dominion will refuse to subscribe to any such contract as that embodied in the license of the patent exploiting firm of Minerals Separation North American Corporation. Truly, the situation warrants immediate action by the Canadian Government, not only in the matter of nationality, but also in the matter of terms of royalty and conditions imposed upon the licensees.

The belief is growing, especially in the Cobalt camp, that the terms of royalty will shortly be fixed and the royalty be paid to the Canadian Government to remain in escrow until such time as the stability of the Minerals Separation master patents is proven.

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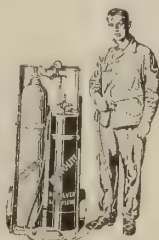
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MINING INVESTMENTS.

It is doubtless lack of information that makes the public so often judge the mining industry from the losses made through gambling in mining stocks. When a man gambles in wheat and loses, he does not blame the agricultural industry. He usually keeps quiet about his losses, but privately he must confess to himself that his losses are due to his own ignorance or inability to properly size up the wheat situation. He should treat the mining industry in the same way.

If a man is heard blaming the mining industry for his losses, he is simply proclaiming to the world that he is a gambler in mining stocks. On enquiry it will usually be found that although he may be a shrewd, careful and successful business man in his own line, when it comes to mining he throws shrewdness and common sense to the winds and ignores usual business methods. Under the circumstances the dice are loaded against

If you wish to invest in the Mining Industry, and not simply to gamble in mining use ordinary business principles and common sense.—A. A. Cole.

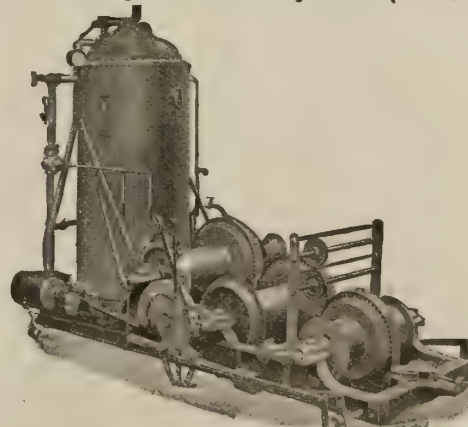
THE AVERAGE TRAIN LOAD.

The following table, showing the source of the freight carried by the railroads of North America, is instructive:

Mineral products, 531; manufactures, 148; forest products, 112; farm and ranch, 109; merchandise, 40; miscellaneous, 60.

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:-: Markets :-:

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 15 cents per lb.
 Dec. 22, 1917—(Quotations from Canada Metal Co., Toronto).
 Spelter, 12 cents per lb.
 Lead, 9 cents per lb.
 Tin, 78 cents per lb.
 Antimony, 17 cents per lb.
 Copper Casting, 32 cents per lb.
 Electrolytic, 33 cents per lb.
 Ingot brass, yellow, 20 cents; red, 2¢ cents per lb.
 Dec. 22, 1917—(Quotations from Elias Rogers Co., Toronto).
 Coal, anthracite, \$9.85 per ton.
 Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York.	London.
	cents.	pence.
November 21.....	85½	43¼
" 23.....	84½	42½
" 26.....	84¼	42¾
" 27.....	84¼	42¾
" 28.....	84¼	42¾
" 30.....	84¼	42¾
December 1.....	85¾	42¾
" 3.....	84¼	42¾
" 4.....	85¾	42¾
" 5.....	85¾	42¾
" 6.....	85¾	42¾
" 7.....	85¾	43
" 10.....	85¾	42¾
" 11.....	85¾	42¾
" 12.....	85¾	42¾
" 13.....	85¾	42¾
" 14.....	86½	43¾
" 17.....	85¾	43
" 18.....	85¾	43

NEW YORK MARKETS.

Connellsville Coke—
 Furnace, 6.00.
 Foundry, 7.00.
 Crushed, over 1-inch—
 Beehive, 7.30.
 By-product, 6.50.

Straits Tin, spot, f.o.b., nominal, 85.00 cents.

Copper—

Prime Lake, *23.50 cents.

Electrolytic, *23.50 cents.

Casting, *23.50 cents.

Lead, Trust price 6.25 cents.

Lead, outside, nominal, 6.50 to 7.00 cents.

Spelter, prompt western shipments, 7.67½ cents.

Antimony—Chinese and Japanese, nominal 15.00 to 15.50 cents.

Chinese and Jap. nominal, 15.00 cents.

Aluminum, nominal—

No. 1 Virgin 98-99 per cent., 36.00 to 38.00 cents.

Pure 98-99 per cent. remelt, 34.00 to 36.00 cents.

No. 12 alloy remelt, 26.00 to 28.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.

Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.45 to \$1.50.

Palladium, \$115.00.

Quicksilver (Nov. shipment from California), \$115.00.

Platinum—Pure, \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic), \$2.70.

Tungsten—

Wolframite, \$22.00 to \$24.00.

Scheelite, \$26.00.

Gravel Fluorspar: f.o.b. mines—

Prompt, \$28.00 to \$30.00.

Contract, year 1918, \$25.00.

Silver (official), 85%.

*Government price.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices—

Hot rolled, 31.50 to 33.00 cents.

Cold rolled, 32.50 to 34.00.

Copper bottoms, 39.50 to 41.00 cents.

(Shipments from stock 2c per pound extra.)

Copper rods—Base prices—

Round, 32.50 cents.

Square and rectangular, 33.50 cents.

Copper wire—Base prices—

nominal, 27.00 to 29.00 cents.

Brass products—Base prices—

Sheets and wire, 27.50 to 29.50 cents.

Rods, 24.75 to 26.75.

Low brass, sheet and wire, 31.25 to 33.25 cents.

Sheets and wire, 30.00 to 32.00 cents.

Rods, 30.75 to 32.75 cents.

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- 1—10 x 10 Laidlaw, steam drive.
- 1—10 x 12 Sullivan, steam drive.
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- 1—8 x 8 Curtis, 2 cyl. Belt.
- 1—Rand, 327 Feet, Belt.
- 2—Bury, 690 feet @ 30 lbs.

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- 126" x 189" x 98"—4100 gals.
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- 3—80 h.p., 550 v., -various speeds.
- 3—75 h.p., 550 v., various speeds.
- 2—50 h.p., 220 v., 800 rpm.
- 1—40 h.p., 550 v., 1000 rpm.
- 1—30 h.p., 220 v., 1200 rpm.
- 2—15 h.p., 220 v., 900 rpm.
- 2—10 h.p., 220 v., 900 rpm.
- 2—5 h.p., 220 v., 1200 rpm.
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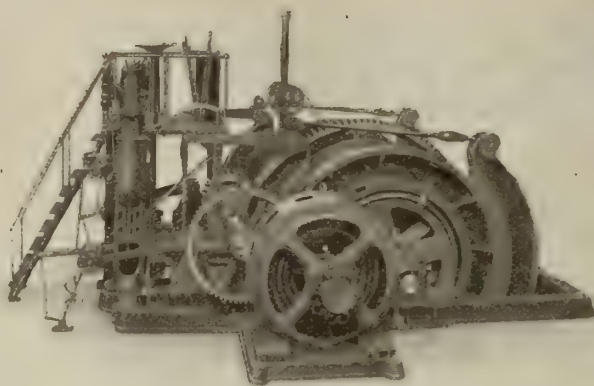
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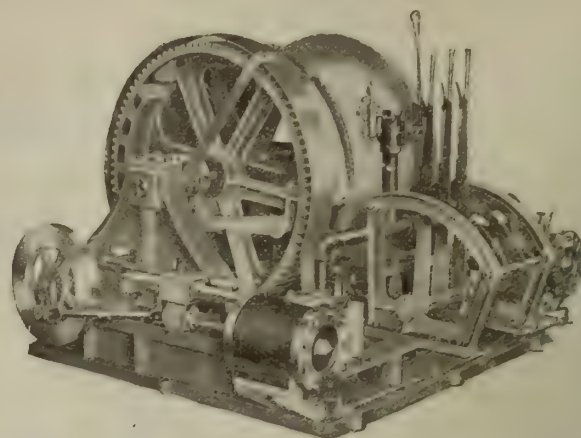
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- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
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- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
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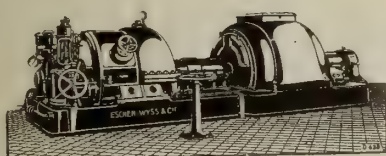
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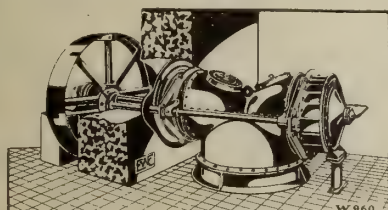
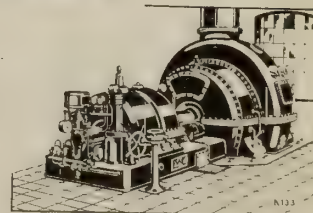
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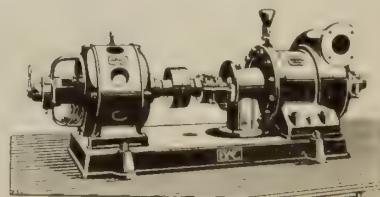
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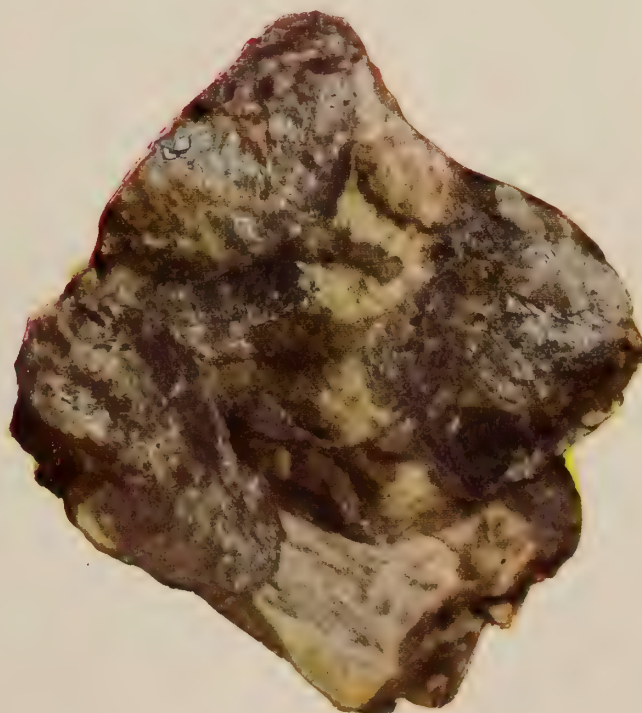
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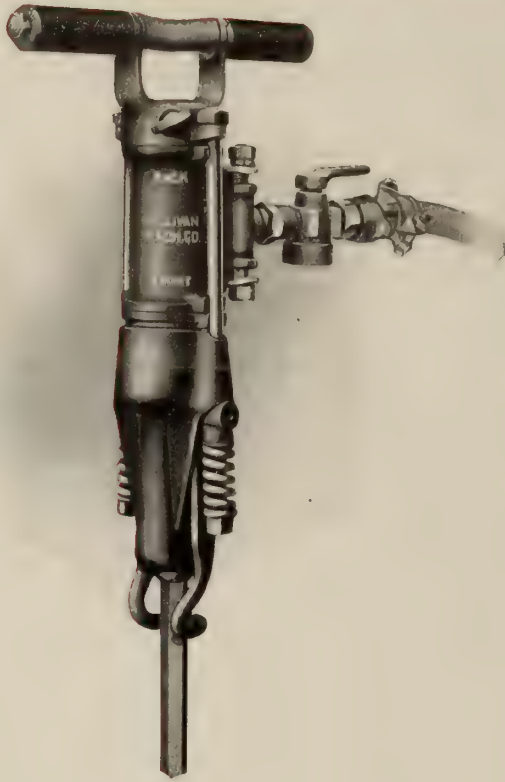
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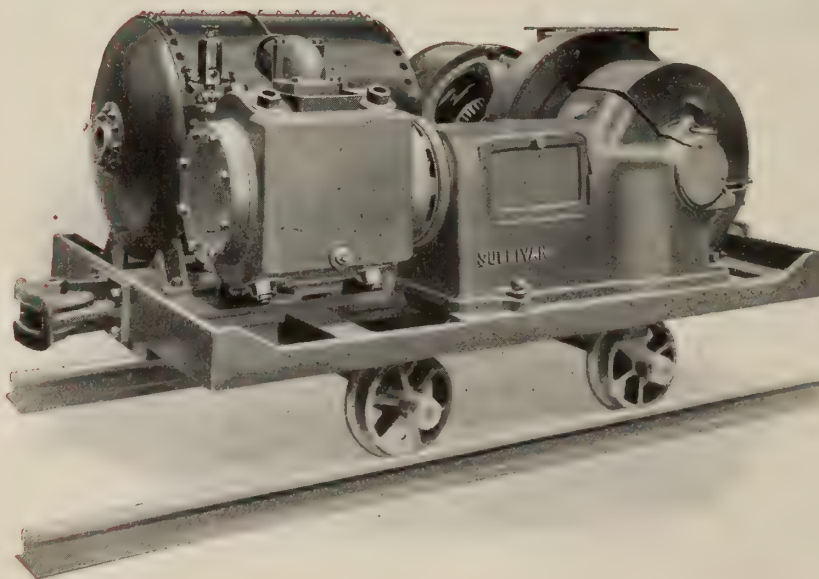


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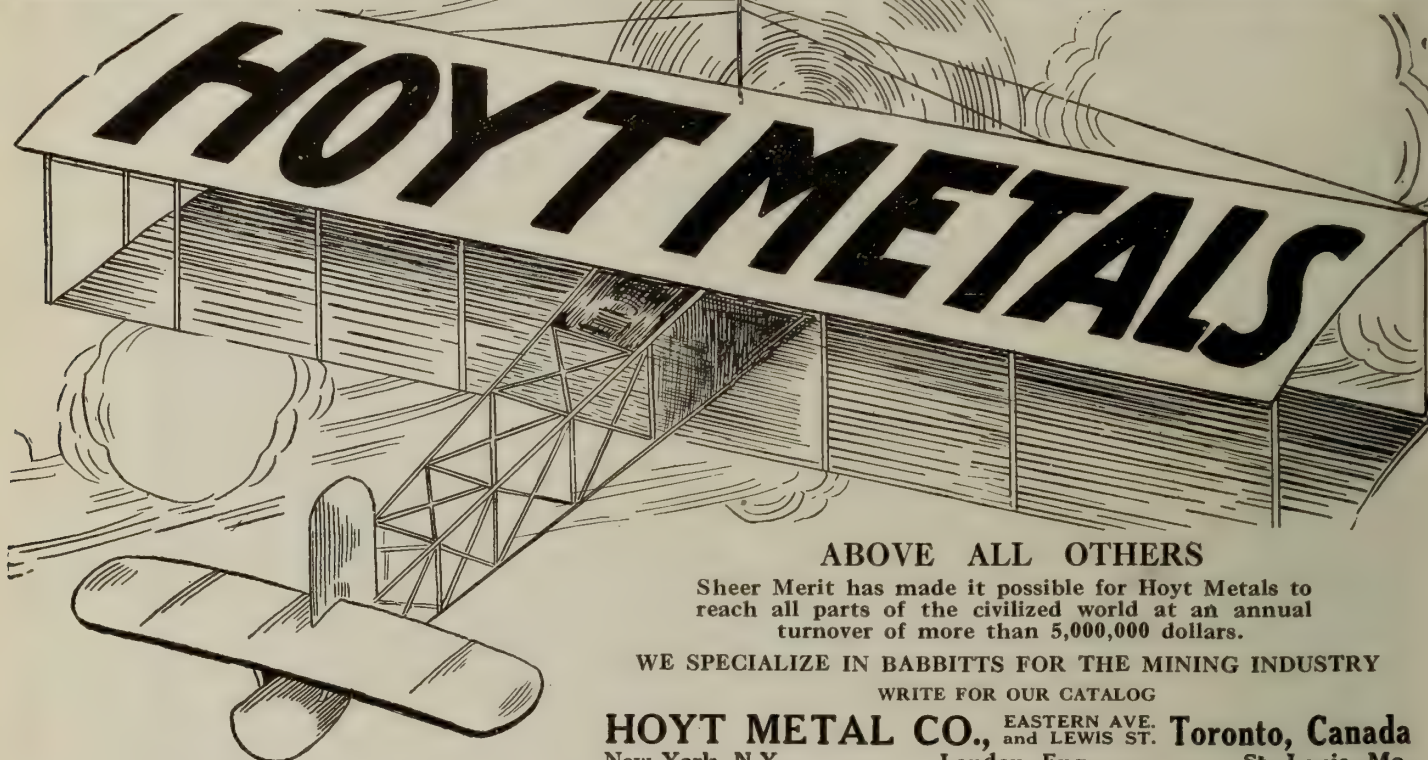
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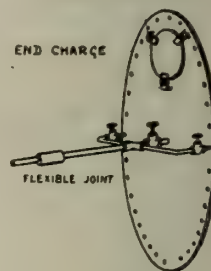
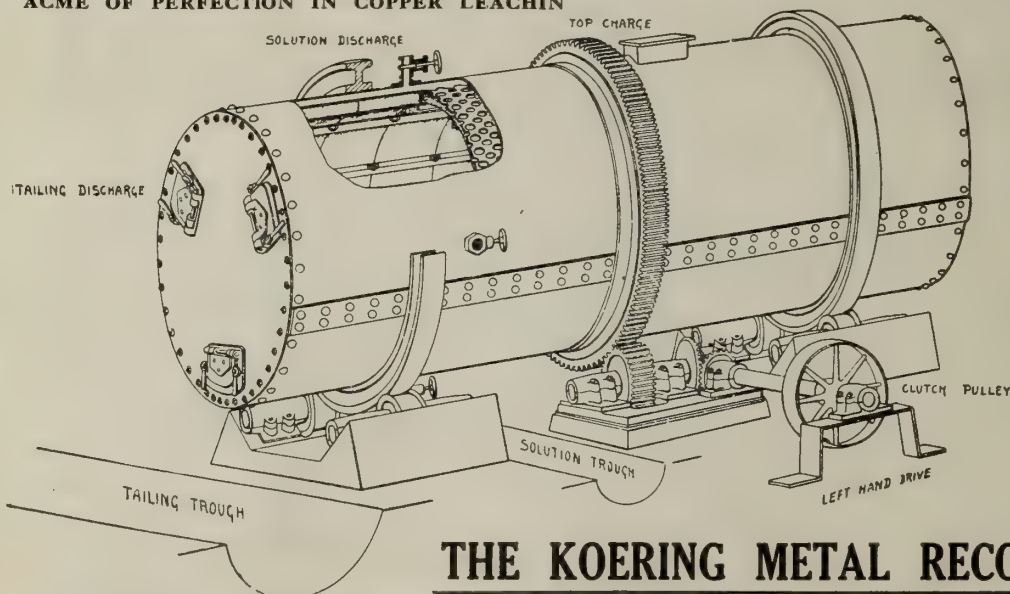
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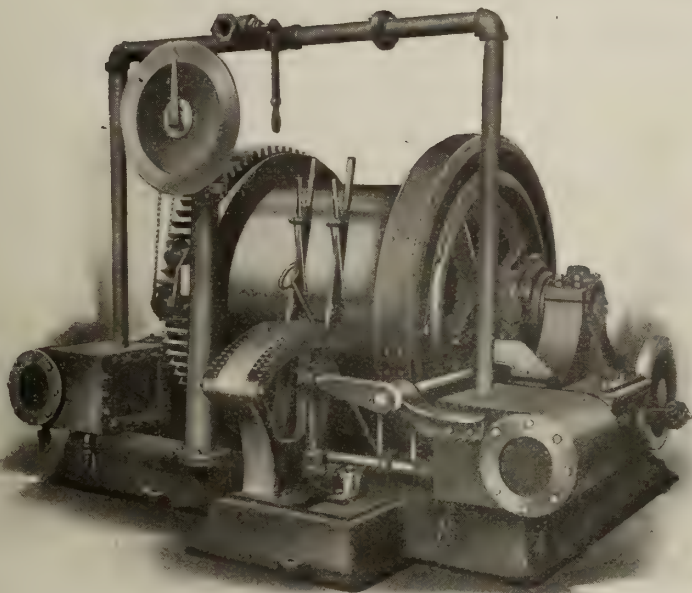
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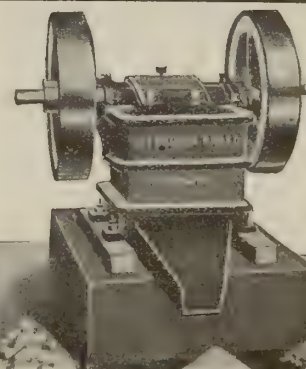
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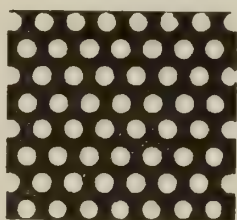
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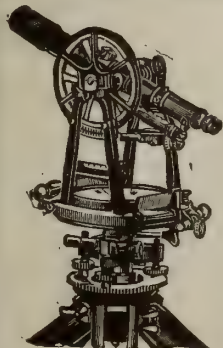
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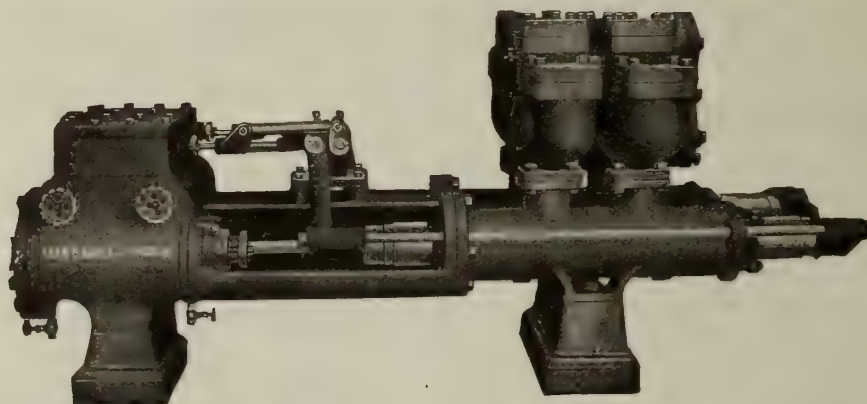
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, January 15th, 1918.

No. 2

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"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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In fixing prices of metals and ores in the United States the producers and the Government have carefully considered costs and needs. In fixing the price of molybdenite in Canada, Canadian producers and would-be producers received no consideration. The price was arbitrarily fixed in England, and our Government until last week showed no disposition to free itself from outside dictation. By putting on an embargo without insisting on a fair price, it met the wishes of the British users of molybdenite and then allowed the Imperial Munitions Board to dictate prices to producers. Everyone is pleased to see the British Government obtain its supplies as cheaply as possible; but it was absurd to expect that the producers should not object to the fixing of prices without consideration of the cost.

The recent decision of the Canadian Government is to be regarded as a hopeful sign. It suggests to us that the folly of discouraging the producer of basic materials is becoming more generally recognized.

THE MOLYBDENITE EMBARGO LIFTED.

The Dominion Government is to be congratulated on its decision to remove the embargo on molybdenite. As we have repeatedly pointed out during the past few months, this embargo has seriously interfered with the development of molybdenite deposits in Canada at a time when there is an excellent opportunity to market this mineral.

Early in the war the British Government fixed the price of molybdenite in Great Britain, and appointed brokers to requisition, at a price of 105 shillings per unit, all shipments arriving in the United Kingdom. The demand for molybdenum naturally rose rapidly with the increased use of molybdenum steel, and the ruling price in the United States is about double that in England. Development of molybdenite deposits in Canada has been given a great impetus by the war; but the placing of an embargo on shipments to the United States forced Canadian producers to depend almost entirely on purchases by the Imperial Munitions Board at a price fixed by the British Government. By this stupid arrangement, which saved the British Government only a paltry sum because its needs were small, Canada was prevented from marketing molybdenite at a good price in the United States; and development of Canadian molybdenite properties has been greatly delayed.

The price paid by the Imperial Munitions Board is not sufficient to pay the cost of mining and concentrating molybdenite at many mines, if any, in Canada; and unfortunately it will now be some time before full advantage can be taken to supply the demands of United States and European manufacturers. It is to be regretted that the embargo was not lifted last spring, as mining could have been carried on more energetically if the action of the Government had not been so discouraging to producers. The few companies which are now in a position to produce molybdenite will, however, be able to take some advantage of the new conditions, and those who have been disheartened by Government interference will now resume their work of development with new courage.

In view of the fact that the prices of many metals have been fixed by Governments, it is not surprising that the price of molybdenite should be fixed. We have no objection to the fixing of a price if it is done by Canadians after careful investigation of the cost of producing the mineral at our low grade undeveloped or partially developed deposits. We do object to the fixing of a price without investigation. The demand for molybdenite before the war was small; but it has so greatly increased that development of low grade and irregular deposits is necessary. The cost of mining such material is necessarily high and should be taken into consideration. Experience in the United States has shown that not enough molybdenite is obtainable when the market price has been over \$2 per lb. With the embargo lifted and Canadian deposits worked, it is probable that a fixed price of \$2 per pound would result in enough molybdenite being mined to meet the demand. It would be an easy matter for the United States and Canadian Governments to agree on a price such as has obtained in England, but such a price makes development of most molybdenite deposits impossible.

A SHIPMENT FROM TAYLOR MOLYBDENITE MINE.

During the past summer, Mr. A. W. Taylor of Toronto has been developing a molybdenite property near Renfrew, Ontario. Recently he shipped to the Mines Branch, Ottawa 42,584 lbs. of ore which averaged 3.4 per cent. MoS_2 , or 1447.88 lbs. On a basis of 92 per cent. recovery the MoS_2 content amounted to 1332.04 lbs.

The flake molybdenite, shipped to another destination, averaged over 65 per cent. MoS_2 . The combined shipment contained over 4 per cent. MoS_2 .

Owing to the severe weather, work at the property is temporarily discontinued. The satisfactory results obtained in the preliminary work indicate that the property will soon become an important producer.

THE EXPORT OF MOLYBDENITE.

The Canadian Government has decided to license until further notice the free export of molybdenum, tungsten, their ores, concentrates and products to approved consignees in the United States and France. It is necessary for exporter to obtain license from Commission of Customs, Ottawa, previous to shipment and from the Bureau of Imports, War Trade Board, Bond Bldg., Washington, a license to import into the United States.

USES OF MOLYBDENUM

At a meeting of the New York section of the American Institute of Mining Engineers held on Sept. 27, 1917, the following comments on molybdenum were presented in a paper prepared by S. H. Ball and published in a recent bulletin of the A. I. M. E.

Molybdenum perhaps more than any other metal has had its production increased by the war. The 1916 production was in tonnage over twenty times, and in value perhaps 100 times, that of 1902. Its use for munitions prior to the war is shown by the fact that the principal consumers prior to 1914 were Krupp and Creusot. The 3 or 4 per cent. of molybdenum used by the Germans in their heavy artillery, and even in rifle barrels, notably prolongs the life of these weapons.

The most important use of molybdenum in peace time is in steel and other alloys. Its consumption in tool steel appears to be at a standstill, but many feel that in this field the metal has not as yet had its final trial. The use of alloys containing molybdenum in automobile parts is increasing. The metal is also employed in small quantities by the electrical and scientific instrument trades. Its salts figure as chemical reagents, pottery colorants and medicines. A salt of molybdenum is used as an explosive preservative.

It is hoped that the war will prove to the steel workers the valuable properties of the metal, and by creating a demand for it, develop dependable sources and stabilize the supply. Tungsten, its chief competitor, has in the past enjoyed the advantage of a much better established production.

The position of being the chief molybdenum producer has changed with remarkable frequency recently. In 1910 Queensland accounted for 50 per cent. of the production, New South Wales and Norway each almost 25 per cent., and Sweden and the United States produced small amounts. Active prospecting, fostered by

war prices, caused the United States to take the lead in 1915, but this year Canada is apparently the most important producer. According to Mr. F. L. Hess, the world's 1915 production was equivalent to 222.6 tons of metal.

Prior to the war France and Germany produced most of the ore, but now England, Canada and America are also making both molybdenum and ferromolybdenum.

The metal 6 years ago was worth about \$1.40 per pound, but since 1914 has been from double to quadruple this figure. The price of ferromolybdenum (containing from 50 per cent. to 85 per cent. molybdenum) is practically that of its molybdenum content.

There are two molybdenum materials occurring in minable quantities, molybdenite, the sulphides, and wulfenite, lead molybdate.

Molybdenite, the most important of these, on cursory examination resembles graphite. It is usually associated with rocks of the granite family. Tungsten deposits, and quartz-molybdenite veins, have to date yielded over three-fourths of the world's production, while pegmatites, tin and bismuth deposits and cupriferous quartz veins have added small amounts. Certain molybdenite-bearing granites might be the basis of large milling operations if the demand for the metal justified the necessary expenditure.

Molybdenite prices are quoted on a 90 per cent. MoS_2 product, although when stocks are short, 20 per cent. concentrates may be saleable. Copper should be below 2 per cent. or 3 per cent., and tin and bismuth less than 0.5 per cent. A number of other impurities are penalized. From 1902 to 1913 the price mounted from \$400 to \$1000 per ton, but since the war it has fluctuated between \$2000 and \$3600. All British production is commandeered at \$22.50 per unit.

Wulfenite is rather common in the oxidized zone of lead-bearing ore bodies, particularly in arid regions. Although it is a less desirable ore than molybdenite, it was practically the only molybdenum ore produced in America prior to 1915. Since the war Wulfenite containing 25 per cent. molybdic trioxide has been worth some \$300 per ton.

It is hoped that when peace arrives the steel workers will have satisfactorily proved the value of the metal, and that its production will increase. It is at least as common in the world's crust as tungsten, and I am inclined to believe that, while its high grade deposits are pockety, low-grade deposits of considerable tonnage exist which will insure a supply of the metal long after the important tungsten producing centres, now known, are exhausted.

OXY-ACETYLENE WELDING.

"Turning waste into profit" is the title of a booklet, recently issued by the Prest-O-Lite Co., Inc., Toronto, dealing with the importance of the conservation of steel and iron through oxy-acetylene welding and cutting. This booklet is profusely illustrated with half-tone engravings showing many examples of Prest-O-Lite welding repairs, which have saved money for manufacturers, railroads, mines, machine shops, engineering and industrial plants in almost every line. We have been advised by the Prest-O-Lite Company that a copy of this booklet will be mailed free of charge to anyone interested.

Bore-Hole Exploration

By C. H. Hitchcock.

The mining business may be divided into four lines of work, prospecting, exploration, mining and metallurgy. Each of these involves many of the sciences and many lines of engineering. In such a business certain branches of the work are more attractive than others and become very highly developed. Those that are less scientifically conducted cause a weakening of the whole structure.

Prospecting is a game of chance, and no matter how well it is conducted, the net result is not to eliminate the gamble but lessen it.

Exploration to-day is probably the weakest link in the mining business, and poor work along this line is yearly the cause of monumental blunders.

As soon as an area of land is chosen as having mineral possibilities scientific exploration is reasonably sure of determining the structure, quantity, and quality of such minerals as may exist. This data is fundamental and should decide how extensive a mining business, if any, can be established to ensure a maximum of profit.

In general the objects of scientific exploration are three fold; to establish ore reserves as a foundation to finance the business; to develop the structure of the orebody so that the mining can be done on the proper scale, and at a minimum expense; to prove quality of the ore so that the metallurgy will be scientifically worked out and a treatment plant built in keeping with the size of the orebody. We want nicety of adjustment of one branch of the work to every other. To get this, reliable exploration data is fundamental and absolutely necessary. Otherwise mistakes are sure to delay and lessen the total dividends. Since a thorough knowledge of ore reserves is of such vital importance, it might be expected that great care would be given exploratory work. Actually it is apt to be poorly done by the best mining companies. It is to be regretted that a mining company seldom realizes what it has missed.

Exploratory work may be done by bore-holes; by shafts, drifts and crosscuts; or a combination of the two methods. Bore-hole exploration is by far the cheapest and can generally be used in preference to the latter methods.

In order to successfully explore mineral lands, it is necessary that an engineer who knows structural geology and exploration methods be given time to thoroughly study the type of ore deposit to be explored before starting actual work. If possible, diamond drill exploration should be chosen because it is the cheapest method, proves tonnage the quickest and gives the maximum of structural information.

The rectangular system of drill holes is likely to be best. The size of the squares to govern the position of the holes depends on several factors, namely: the size of the deposit, the character of the mineralization, the depth of the holes, and the character of the rock to be drilled. A large area of ore outcrop of even mineralization and regular outline will stand large squares, while small deposits of uneven mineralization and irregular outline require smaller squares, necessitating a greater footage drilled to get reliable data. Exploration requiring deep holes demands large squares because of the deflection of the holes, otherwise the holes will cross and one will thereby

become of little value. Holes drilled in brecciated, broken material, rocks of unequal hardness and sediments, deflect greatly, and for the same reason require larger squares.

The angle of the holes should be tested at regular intervals from the surface in order to secure accuracy. E. J. Longyear Company, 710 Securities Bank Building, Minneapolis, Minn., can furnish complete apparatus for this work.

The Knight and Stone core barrel is considered the best double tube core barrel on the market and is supposed to give a maximum recovery of core in soft ground. Large rods extracting a large core will generally give a better recovery of core and may insure straighter holes.

All cores must be carefully studied and the relative ages of the formations determined. Failure to do this has caused irreparable blunders. The core requires assay of economic metals contained as well as those elements that may have a bearing on the metallurgy of the ore. The metallurgical side is too often neglected.

When the orebody is surrounded by barren holes the deposit may be considered thoroughly explored. The quantity and quality make it possible to decide intelligently regarding future financing, mine development, and the metallurgy of the ore. All work such as mine development, treatment plant, townsite, etc., can go ahead at the same time. In this way maximum production will be reached in the shortest time, at the least total expense, and give the maximum of dividends when the ore body is exhausted.

The Appeal Tribunal at Sudbury presided over by The Hon. Mr. Justice Ferguson, decided on December 28th, 1917, that exploratory work was unnecessary for the duration of the war. As a result ten skilled diamond drill runners are liable to military service. These men cannot be replaced, so that a large part of the exploratory work during 1918, if done at all, will have to be done by the very expensive and tedious method of sinking shafts, driving drifts and crosscuts, utilizing many times the number of men.

OBITUARY

Mr. Wm. Rowe, for a considerable part of the last twenty years engaged in mining in British Columbia, died suddenly in Nelson, West Kootenay, B. C., on the night of December 24, in his 54th year. He was born in Cornwall, England, and came to Canada about twenty-two years ago. He was in charge of the B. C. mine, in Boundary district in the late nineties and, too, when, in 1900, about 20,000 tons of copper ore averaging about 5 per cent. copper, was shipped to the smeltery at Trail, 4,000 tons of which was the first important shipment of copper ore in the Boundary district. In later years he supervised development work on some valuable coal lands in the Blairmore-Frank district of Southwest Alberta. After that he was for several years superintendent of the Jewel gold mine, in Greenwood mining division, Boundary district. He was one of a number of thoroughly good Cornish miners who assisted appreciably in developing mines in Boundary and Kootenay districts of British Columbia.

The Development of the Ankerite Gold Mine

By Clifford E. Smith.

The following is a brief summary of the operations of the Coniagas Mines, Ltd., in the Porcupine Mining division, as contained in a report to the directors:

Operations have consisted of examination of gold prospects, exploration of properties held under option of purchase and of properties acquired by purchase and general organization for the development of gold deposits indicated by such exploratory work. Examination of Ontario gold prospects had been conducted by the directors of the company for some time previous to October, 1915, but of the prospects offered and examined prior to that time, none was deemed of sufficient promise to command the attention of the company.

During October, 1915, preliminary examination was made of a group of three mining claims known as the Ankerite property, situated in Deloro Township and about four miles south-westward from the town of South Porcupine. Results of this examination indicated the possible existence of gold deposits of more than ordinary promise and the directors of the Coniagas Mines, Ltd., decided to explore this property, subject to a satisfactory option of purchase from the owners. Negotiations for a suitable agreement were concluded successfully during the following winter, and prospecting work was begun in April, 1916, and was continuous until April, 1917, during which period of free option a systematic exploration was made of a part of one of the three claims, known as claim M.E. 61.

This work was confined to a zone in which a vein system was indicated. By an extended series of cross-sections of this zone, made by surface cross-trenching and cutting, underground cross-cutting and diamond-drilling, this vein-system was defined as continuous for a length of approximately 1,500 ft. across claim M. E. 61. Systematic sampling followed each cross-section of the several veins and assay results of each section were satisfactory, showing more than ordinary widths and continuity of commercial gold values. This plan of exploration was completed in April, 1917, permitting then a correlation of all results and reasonably safe conclusions respecting the promise of the property. The directors were then advised that they were justified in making the small preliminary payment due that month toward purchase and in undertaking a systematic development of the deposits along the lines which this exploratory work had indicated.

During this first period of work it was found that the vein-system under exploration extended westward from the Ankerite property for some undefined distance across an adjoining group of two claims known as the Maidens-McDonald property. Having evidence that such extensions would prove of value as adjuncts, negotiation for purchase was begun with the owners, and on August 9th, 1917, an option of purchase was concluded, at a price considered safe and reasonable. This option has since been exercised.

Development work decided for the Ankerite was deferred pending these negotiations, so that location of the first working shaft could be determined accordingly. Upon completion of this option, work was resumed under a general plan of development and exploration combining the prospects of both groups and is being pushed as vigorously as working conditions will permit.

This second period of exploration of the Ankerite is producing further satisfactory results, prospects, both of deposits and net values, being extended considerably. Our earlier opinion has been confirmed, that at the eastern boundary of the Ankerite claims the general system of fissuring swings from a north-east strike back sharply toward the north-west, following the swinging brow of elevated country and remaining well within the Ankerite boundaries. This set of conditions appears to preserve within the Ankerite eastern boundaries, both on strike and dip, the major possibilities of Ankerite vein-systems.

On the Maidens-McDonald property, exploration is being extended westward from the Ankerite boundary. This work is following new lines and is defining important extensions and values.

A new power plant has been installed on claim M. E. 61 and is now in operation, serving power for shaft sinking and electric lighting of general buildings. This plant consists of a boiler of 150 H.P. capacity, a "6 drill" air compressor, hoisting engine with drum capacity for 800 ft. depth, engine and generator for 185 lights of 40 W. each, Leyner No. 5 drill sharpener, and general equipment complete for efficiency.

In acquiring the Maidens-McDonald property a power-plant already installed thereon was purchased. This consists of two boilers of about 40 H.P. capacity each, and a "6 drill" unit of a "12 drill" compressor, the other unit to be installed. This plant was put in order and air connections made with the new plant on M. E. 61, so both plants may be used for operations, or one as a reserve for the other.

There is abundance of wood on the properties for over one year of requirements, and this is used as fuel, the cutting serving the double purpose of supplying fuel at a relative cost of less than one-half that of coal and of clearing the ground against risk from fires.

When this fuel has become exhausted and development has exceeded the capacity of these steam plants, electrical power will have been installed suited to extended working requirements.

Camp buildings have been constructed and equipped with capacity for about 75 workmen. The shaft-sinking crew comprises about 35 men, and about 25 more workmen are now employed in operations.

A vertical shaft is now being sunk on M.E. 61, located for development and working of sections of M.E.61 and H. R. 832 (of the Maidens-McDonald group). This shaft is designed for both development and producing purposes and consists of three compartments, each 5 ft. x 5 ft. inside timbers. From this, at proper levels, stations will be cut and cross-cuts of the vein series made as sinking advances, from which development of deposits will follow.

During the coming fiscal year of your company a very considerable underground development and determination of deposits should be accomplished.

Published comment in Spokane, Washington, relative to the Slocan Co.'s affairs is that it begins to look as if a receiver's sale will be necessary, in which event it may be possible that some scheme will be worked out by the White interests whereby the property will be transferred free of debt to a new corporation in which all shareholders in the present company who shall see fit to participate will be allowed to do so.

CONSOLIDATED. M. AND S. CO.

W. D. Matthews, president of the Consolidated Mining and Smelting Company of Canada, in the report, dated December 28th, of the operation of the Company for the year ending September 30th, 1917, said:

The net profit is \$1,076,828 after writing off \$648,058 for depreciation of plant and equipment and charging Profit and Loss Account with \$380,071 in development of the properties. The balance at the credit of Profit and Loss Account now stands at \$2,360,274.

Operations at the smelter, refineries and mines have been handicapped during the year by strikes, causing a serious shortage of coal, which resulted in the discontinuance for some time of shipments of ore from the Rossland mines and a curtailment of ore shipments from other properties.

Labor conditions have been unsettled and difficult during the year and finally resulted after the close of the year in a general strike of the men employed in the smelter at Trail, and a complete cessation of the operations of the company. This strike has within the past few days been settled and the plants and properties will recommence operations immediately.

Notwithstanding all the difficulties encountered during the year, the value of the season's metal product exceeded \$13,000,000.

Producing Sixty Tons Zinc Daily.

Managing Director J. J. Warren says:

The electrolytic zinc plant was completed during the year. Various improvements were made in the process and more are under consideration. A daily production of over 60 tons of pure zinc was reached. An extraction of over 90 per cent. was made from certain classes of ore. Now that the process may be considered to be standardized, every effort is being made to reduce the cost of production. So far there has been no difficulty in disposing of the entire output. The year's production of 10,000 tons of pure zinc, of a value of \$3,000,000, marks another epoch in the metallurgical history of Canada. A concentrating mill with a capacity of 400 tons of ore per day has been erected to treat the Sullivan zinc ores prior to their being put through the zinc plant proper. It has been demonstrated that a much higher extraction can thus be made and at a moderate cost.

Produced 22,000 Tons Refined Lead.

The production of refined lead amounted to over 22,000 tons—or more than 2,000 tons in excess of the product of the previous year. About 75 per cent. of this was sold to the Imperial Munitions Board.

The metallurgical results were the best in recent years.

The production of gold was less than in the previous year because of the Rossland mines having been operated only about half the year.

The production of silver was greater than in the previous year because of the higher silver content in the lead ores received.

Sulphuric Acid Plant Doubled.

The sulphuric acid plant was doubled in capacity. After supplying the entire needs of the refineries and the zinc plant, there is a surplus product for sale commercially.

The hydrofluosilicic acid plant provides the entire requirements of the lead refinery.

Unsatisfactory Operating Conditions.

Operating conditions during the year were unsatisfactory. Supplies of all kinds increased in price. La-

bor, in addition to demanding (and receiving) a higher wage scale, showed a marked decrease in efficiency.

The production of the Rossland mines was only about one-third of normal. This reduced profits and increased operating costs. The Sullivan mine maintained its position as the largest producer.

The statement of the West Kootenay Power and Light Company shows satisfactory earnings. For the most part these represent revenue from electric energy supplied the parent company. The power company has contracted with the Northport Smelting and Refining Company to supply a maximum of 1,500 horsepower for a term of years and with the Canada Copper Corporation to supply a maximum of 5,000 horse-power for ten years. The rates obtained are satisfactory and insure substantial additions to the earnings of the company. A transmission line is being extended to the works of the Northport company. The necessary steps are being taken to extend another transmission line from Greenwood to Princeton and Copper Mountain, where the works of the Canada Copper Corporation are situated.

The value of the year's metal product—over thirteen million dollars—is the greatest, by far, in the history of the company.

Acquiring Gold Properties.

A policy of acquiring and developing gold ore properties is being pursued, to provide against the possibility of a decline in the demand for base metals after the war.

The Canadian commercial requirements for base metals having slackened very considerably during the war, the Imperial Munitions Board have absorbed the bulk of the production. The Board are very keen buyers. Recently they have required that the prices current in the United States markets be met by the company—except for a fair allowance in the matter of freight charges.

Duty on Machinery Increases Cost of Mining.

The cost of production in Canada is necessarily higher than in the United States on account of the more refractory character of the ores treated and the smaller size of the operations. Besides, all supplies used in connection with Canadian mining, smelting and refining cost about forty per cent. more than the same supplies in the United States, the Canadian price being practically the United States price plus the duty into Canada.

This operates as a hardship on the Canadian production of metals when they have to be sold at the United States prices. If the Company's sales to the Imperial Munitions Board had been made at the Canadian commercial prices of the day—instead of the United States prices of the day—the difference in the net profits would be very substantial.

It is hoped that in the future the Board will take a more favorable view of the conditions under which metals are produced in Canada.

Early in 1917 Mr. R. H. Stewart left the service of the company to engage in consulting and other engineering work in Vancouver.

On July 1st, Mr. F. N. Flynn became General Superintendent of Smelting and Refining. From that date, Mr. E. H. Hamilton devoted his entire attention to the zinc plant.

The selling organization, in charge of Mr. W. S. Rugh, west of the Province of Quebec, and of Thomas Robertson and Co., Limited, east of the Province of Ontario, gave satisfactory results.

Recent Industrial Uses of Aluminum*

By F. G. Shull.

In preparing a paper on this subject I have chosen to refer to the following materials, practically all of which have reached stages of commercial importance during quite recent years: Aluminum foil. Aluminum bottle caps and jar closures. Manufactures, involving autogenous welding. Die and pressed castings. Tubing for store service. Rolled rod for machinery purposes. Aluminum conductors, steel reinforced.

The aluminum foil industry has grown from practically nothing to a volume of business involving many tons of aluminum annually. At the start, the product consisted principally of plain foil, not appreciably unlike plain tin foil in appearance, which was used for wrapping candies, chewing gum, teas and the like. Later on the development of the process for embossing and printing aluminum foil opened up a field among manufacturers of chocolate bars, cheese, toilet soaps, etc., so that to-day a very considerable tonnage of this foil is being used in the embossed and printed form.

Plain foil is being used to some extent in electrical condensers. A most recent use for plain foil, which has, as yet, just barely started, is for the lining of pulp board cartons for the packaging of coffee. This combination package possesses moisture resisting, and oil retaining characteristics not inferior to the tin can, as a coffee container.

Aluminum bottle caps and jar closures on the market, known as the "Goldy" seal, have, like foil, advanced from a meager beginning to a business of substantial proportions during a very few years. They are being used on practically all food products put up in glass, such as grape juice, fruits, preserves, ketchup, pickles, salad dressing and so on. While this seal possesses the non-refillable feature and requires no opener to remove, it owes its success, in a great degree, to the fact that it is aluminum, which is known to be non-rusting and strictly hygienic.

The development of a process of welding aluminum by means of the oxy-hydrogen and oxy-acetylene flame has opened an almost limitless field for the outlet of aluminum. Sheet aluminum of all gauges heavier than about one-thirty-second of an inch can be readily welded and the seam dressed off so that it is difficult to locate the joint. Consequently it is possible to build up an aluminum tank or container of almost any size and shape which, when welded together, is practically a one-piece job. This class of material finds a place in breweries, ginger-ale plants, milk depots, chemical plants, and, in fact, wherever seamless metallic non-rusting containers are wanted. The one-piece feature is of marked advantage over the riveted tank which is always liable to spring a leak.

For a long time it has been considered a difficult proposition to die-cast aluminum. At the present time, however, this problem seems to have been solved, as there are several companies that claim to be successfully die-casting this metal.

Another quite recent development is the subjecting of sand castings to very high pressures in order to render the metal more dense and to increase the

strength. Such castings have found use in the making of parts for the timing devices of shrapnel, it being found that these castings not only possess extra high strength, but that they also machine exceptionally well.

Aluminum tubing for pneumatic store service is not a new field for aluminum, strictly speaking, since it has been gradually coming into use for the past several years. It is a fact, however, that the last few years have seen the volume of aluminum consumed for this purpose reach a stage where the tonnage involved is of very great importance. The natural characteristics of the metal itself principally recommend it for this use.

One of the most interesting developments in the aluminum industry of recent years is the rolling of high alloy rods in practically all commercial sizes. In the past, commercial aluminum rod has been largely a drawn product. This method of manufacture prevented the use of aluminum alloyed with any appreciable percentage of other metal, for the reason that in the drawing operation the surface, principally, of the rod is worked. The result is that the surface becomes hard while the body of the rod is left comparatively soft. Therefore, only the smaller sizes of drawn rod are suitable for machining.

By the rolled method of manufacture not only is it possible to use highly alloyed metal, but also the process tends to work the entire mass of the rod so that the finished product is a good uniform homogeneous material which machines well throughout its entire substance. This process, therefore, makes available a good machining aluminum rod in all commercial sizes for automatic machine and turret lathe products.

One of the first uses for which this rolled rod was tried was for the machining of the fuse-timing parts for shrapnel. While it worked perfectly for this purpose, it so happened that the principal timing parts were of such a shape that in making them from rod it was necessary to cut away a great deal of the metal, resulting in high scrap loss. It was found that sand castings of the general shape of the parts to be made could be subjected to a compression process and rendered highly satisfactory for this purpose, with a minimum of scrap loss. Consequently, as a commercial proposition, the rolled rod could not compete with the compressed castings for this particular article. It will without doubt, however, find wide usage for automatic machine products.

Aluminum cable, steel reinforced, is not a very recent aluminum product, it having been in commercial use on an extensive scale for the past few years. It is, however, sufficiently little understood to seem to warrant reference being made to it under the title of this paper.

The excuse for the existence of such a product as steel reinforced aluminum cables lies in certain inherent characteristics of aluminum which needed improving in order to recommend its use for long span, high voltage work. The particular characteristic to which I refer is the coefficient of expansion of aluminum, which is approximately one-third greater than that of copper. Due to this greater expansion the aluminum line lengthens a little more with temperature rise, and shortens a little more with temperature fall, than copper. The result is that it is necessary to string aluminum wire with greater sags than copper wire, in order that its strength may not be overtaxed at low

*A paper presented at a meeting of the American Institute of Metals.

temperatures. By allowing this greater sag at ordinary temperatures, combined with the higher coefficient of expansion of the aluminum referred to, one is apt to get excessive sags at extremely high temperatures in summer.

This was a condition of comparatively little importance in the early days of low voltages and short spans, but with the advent of higher voltages and long span, steel tower construction, the characteristics of aluminum cable, as referred to above, became a serious menace to its commercial existence.

What aluminum cable lacked was high tensile strength and low coefficient of expansion. In order to impart these characteristics it was proposed to make the centre strand of a seven-strand cable, of steel, and the six outer strands, of aluminum, the steel to furnish the strength, and the aluminum the electrical conductivity. A very high grade plow steel wire was selected, which was triple galvanized to prevent corrosion, and the practical tests which followed proved that the theory was correct; that the composite cable took on characteristics different from either of the component metals, and was highly satisfactory for long span work.

It is found feasible to construct these cables with any standard number of strands, varying the proportion of steel and aluminum to meet the particular strength and sag conditions required.

Aluminum cable, steel reinforced, began to grow in favor from the start, so that to-day many of the most modern transmission lines on the American continent are built with this cable.

This, in a general way, will give a hint as to some of the more recent uses of aluminum. The automobile industry is, of course, the big factor in the aluminum business to-day, but the relative importance of some of the other fields for this metal seem to be greatly on the increase.

Mr. J. A. Macpherson, manager of the Cariboo-Chisholm Creek Mining Company, in which it is understood Toronto men are interested, has been quoted by the Cariboo Observer as having stated that the tunnel on the Company's property on Chisholm Creek, Cariboo, crosscutting the channel, is about two-thirds in gravel, with something like two feet of bedrock in the bottom. The gravel looks well; red, rusty looking stuff, and is well washed. The bedrock, unfortunately, is soft, and, the Observer remarks, although it is not known except to the management, what value it contains, not much can be expected until there shall have been a change, which may happen in a set or two, after drifting up-stream shall have been undertaken.

A Northwestern copper-mine manager has been quoted as having stated recently, in order to show what the copper-mining companies "are up against," that after careful investigation he has found that: Cost of wages at present, as compared with the average of 1915, shows an increase of 35 per cent.; cost of supplies, an increase of 45 per cent. Labor efficiency has at the same time had a tremendous diminution as shown by the fact that the average number of tons per man per shift now as compared to 1915 shows a decrease of 35 per cent. Under these circumstances the present selling price of copper can hardly be more advantageous to the copper companies than would be a price of 15 or 16 cents with pre-war costs.

THE LEAD-ORE SITUATION IN BRITISH COLUMBIA.

Following the settlement of the strike of its employees at Trail, British Columbia, the Consolidated Mining and Smelting Company of Canada, Ltd., invited the lead-ore producers of Kootenay district to meet its officials in conference relative to the present situation in regard to the disposal of lead ores. The meeting was held in Nelson on Dec. 27, and the Daily News, of that city, gave the following account of the proceedings:

The crux of the situation is that the Imperial Munitions Board is unable to place any more lead orders at the present time, though an early improvement in the situation is expected.

Most of the lead producers of the Kootenay lead district were in attendance, but the Slocan mine owners were unable to attend owing to train service being interrupted.

The Consolidated Company officials, after the lack of market had been thoroughly discussed, were asked what the company could do.

They stated that they could not receive any lead ore until Feb. 1. It will take until that time to get rid of the accumulation which resulted from the recent strike at the smelting works and refineries at Trail. Two hundred carloads of ore were unloaded by the office staff of the company after the smelter men went out. After Feb. 1, the officials stated, the smelter could take each month until further notice one-twelfth of 25 per cent. of the production of the mines for the year ending Sept. 30, 1917, and settle for it on the terms of the "pooling" circular of Nov. 5. From the same date, Feb. 1, the smelter could receive each month one-twelfth of the remaining 75 per cent. of last year's production and settle for the silver contents on the terms of the circular of Nov. 5, but the lead contents would have to be stored and settled for only after the lead now on hand had been sold and the lead contents of the 25 per cent. of new ore disposed of.

It was intimated that probably arrangements could be made with the banks to advance against the lead stored sufficient to enable the properties to continue operations. The company stated that it would do everything possible to facilitate such an arrangement with the banks.

The company agreed to continue to limit shipments from its own mines in the same proportion as the shipments from the independent producers were limited.

As to zinc, the smelter company expects to be able to receive normal quantities of ore during February. After that month receipts will depend upon further orders being received from the Imperial Munitions Board.

The question of the receipt of shipments of ore from the Electric Point Mine in the neighboring State of Washington, was mentioned and the officials of the company explained that the ore was necessary for fluxing purposes and was accepted only in sufficient proportion to flux the ores from the properties on this side. The company could refuse to accept ore from this mine but the effect would be to increase the cost of smelting the British Columbia ores. The British Columbia mines, if this were done, would thus be burdened with the extra cost.

Officials of the company present at the conference were: Messrs. J. J. Warren, managing director; S. G. Blaylock, assistant manager, and T. W. Bingay, controller.

War Minerals*.

By A. G. White.

From the standpoint of essential use and importance, the two great basic materials necessary for the production of modern high-power explosives are nitrate, chiefly in the form of nitric acid, and concentrated sulphuric acid produced from pyrite, sulphur or smelter fumes. In the manufacture of this acid, platinum is essential for the contact process of producing sulphuric acid and for a possible similar use in the oxidation of ammonia to nitric acid. Mercury is essential as the material used for explosives and war munitions, for detonating practically all high-power explosives.

As a second group of minerals for military purposes, come the minerals for munitions and military equipment. Of these the chief group is formed of the steel alloys, which are small amounts of the rarer metals added to our iron and steel products to give them absolutely essential qualities particularly required in munitions, ordnance, battleships, machine tools, aeroplanes and automobiles. Of these the most important are manganese, tungsten, chromium, nickel, cobalt, molybdenum, vanadium and uranium. The major metals, iron, copper, lead and zinc, represent materials of which we have produced a very large percentage of the world's supply. The problems in those minerals are quite large, involving transportation and labor supply, but not requiring new research work or the stimulation of small and unknown deposits. In this second general group come aluminum, which is largely used for automobile and aeroplane parts; antimony, which is used as an alloy for hardening lead bullets; and magnesium, which is used in shells for smoke and light purposes, to detect the point at which they burst.

Another group of minerals essential to industry includes particularly agricultural fertilizers. Potash and phosphates, which are used chiefly for fertilizers, are in this group. Then comes a group of miscellaneous minerals: tin, which is used in food containers; flake graphite, which is used for crucibles for steel, brass, bronze, etc., and is essential in metallurgy; mica, which is used as an insulating material for electrical apparatus and particularly as a transparent material in the construction of gas masks and in the automobile service; asbestos, which is used for fireproofing, ship construction, etc.; magnesite, which is used in the construction of refractory brick in many metallurgical furnaces.

The final group represents the large fuel group, coal, coke, petroleum and natural gas, and those again fall into the large group of materials which represent specific problems of transportation, labor supply, etc.

Mr. A. L. Smith, of Alberni, Vancouver Island, B. C., has informed the Daily Colonist of Victoria, that he has discovered nickel-bearing pyrrhotite on some mineral claims on Barkly Sound, V. I. He states that a sample assayed at the Provincial Government assay office, Victoria, gave a return of 1.5 per cent. nickel (metallic), and two samples assayed by the Canada Department of Mines, Ottawa, gave, respectively, 2.32 and 2.48 per cent. nickel (metallic). Mr. Smith added that "the contact vein is the oldest of rock formations and can be traced on the surface 1,900 feet through the claims. The nickel-bearing pyrrhotite is easily distinguished from the pyrrhotite which does not contain nickel."

*Extract from an address before the St. Louis Meeting of the American Institute of Mining Engineers.

NEW PLANT AT TRAIL, B. C.

Mr. E. H. Hamilton, Metallurgical Manager of Consolidated Mining and Smelting Company of Canada, summarizes additions made to the plant during the first six months of 1917 as follows:

Lead Plant.

The new ore bedding system was completed and put into operation, affording two large beds for mixing and storing unroasted ore.

Lead Mill—Improved facilities were provided for crushing ore.

Dwight-Lloyd Roasting Plant—A new unit was started on June 24th with a view to ultimately adopting double sintering.

Silver Refinery.

A flue gas scrubber was installed to recover values previously lost in smoke.

A smelting retort was installed in place of the old type reverberatory furnace for treatment of refined silver.

The new Bluestone Plant was put into operation.

Electrolytic Copper Refinery.

The capacity of the Copper Refinery was doubled. New air lifts were installed for circulating electrolyte. New slime launders installed.

Copper Melting and Casting Department—Furnace and casting facilities were rebuilt and remodelled to double last year's casting capacity.

Sulphuric Acid Plant.

During the year 2872.7 tons of 100 per cent. Sulphuric Acid were produced.

The capacity of the plant was doubled, and is now capable of producing 30 tons of chamber acid per day.

Hydrofluosilicic Acid Plant.*

During the year 196 tons of 100 per cent. Hydrofluosilicic Acid were produced.

The installation of two new retorts is well under way. This will double the capacity of the plant.

Zinc Plant.

The following additions were made to the plant during the year:

Grinding Department—One ore drying rotary kiln has been installed, also other improvements.

A new tube mill has been added to the equipment.

Roasting Department—Four new Wedge-Roasters have been completed, making 13 in all.

Two roasters have been altered and equipped for use as preliminary roasters for the flotation concentrator.

Two Concrete Storage Bins with a capacity of 1,000 tons of Calcine have been built, also screw conveyors, a pumping station, pump, etc., to handle the calcine from these bins.

A link belt steel cased elevator was built and used for calcine.

Leaching Department—During the year the improved counter current system was completely installed and put into operation.

The following additions were made to the plant: 5 new Agitating Pachucas, 3 new Precipitating Pachucas, 10 40-ft. Dorr Thickeners, 4 large Kelley Filter presses bought, installed and operating; 1 large spare Kelley press bought.

Air Lifts—A shaft 75 ft. deep and lagged has been completed, into which 15 air lifts have been installed for handling the acid and other solutions, and thus eliminating pumps. The results have been very satisfactory.

Pumps—Two large bronze Gould Triplex plunger pumps for handling electrolyte have been bought and are operating.

Four Dorr Classifiers have been moved to Pachuca floor.

Two Dorr Classifiers placed over neutral thickeners.

A Diaphragm Pump has been developed and many installed. It is both simple and efficient and without it the counter current system on this class of ore would be impossible.

Two Electrolyte Storage Tanks with capacity of 1,000 tons each were built and put into operation.

Two Lead Lined Acid Electrolyte Storages with capacity of 1,000 tons each were built and put into operation. Lead Linings were put in 8 of the previously installed 16 ft. acid storage tanks. Two 20 ft. storage tanks, one of which is lead-lined, were installed with trestles 40 ft. high.

Elevators—3 elevators for calcine were erected. A Leaching Plant for Customs Ore was built. It consists of 3 Pachuca Tanks; 1 20-ft. Dorr Thickener; 1 Oliver Filter; 3 Concrete Bins; Conveyors and Elevators.

A slimes Filtering Plant with a capacity of 100 tons was built.

Electrolytic Department—Building and Room No. 2 was completed and operated. The whole circulating system of the two tank rooms, including 832 tanks, was reconstructed and greatly improved.

Melting and Casting Department—A new melting furnace was constructed to meet the increased output to 60 tons zinc per day.

Fine Atomizing Apparatus—A small oil fired furnace with oil and air piping, etc., was installed; also an electric furnace for atomizing zinc, also chamber for collecting the zinc and an electrically driven screening system.

A new wash house with shower baths, lockers and room for lunch was built.

Compressor Room—During the year facilities for compressing air were much increased by installing gear drives on the large compressor.

A new high pressure cylinder was added to the Ingersoll-Rand Compressor.

A new high pressure air compressor was bought and installed.

A small air compressor was installed for atomizing zinc.

Generator Room—Seven more motor generator sets were installed, making 13 in all.

A Machine Shop with shafting, lathe, shaper, forge and other tools was installed for quick repairs.

The monthly output of pure zinc has risen during the last six months from 830 tons to 1,322 tons.

The plant is producing, on a commercial scale, Bluestone, Sulphuric Acid, Hydrofluosilicic Acid, Gold, Silver, Copper, Lead and Zinc.

Mr. F. S. Norcross, Jr., for some time superintendent of mines for the British Columbia Copper Co. and the Canada Copper Corporation, was the recipient of a valuable presentation, subscribed for by employees on Christmas Eve at the latter company's big camp at Copper Mountain, Similkameen, the occasion being his enlistment in the Engineering Corps of the United States Army and his consequent intended early departure for the training camp at Petersburg, Virginia. Mr. P. E. Crane, who has been superintendent at the company's Mother Lode mine, near Greenwood, Boundary district, has been transferred to Copper Mountain, to there assume duty in succession to Mr. Norcross.

PERSONAL

Mr. Samuel W. Cohen, General Manager of Crown Reserve Mining Company Limited, has returned to Montreal after a six weeks trip of examination in California and Colorado.

Mr. W. E. Segsworth is in Ottawa.

Mr. George Guess, professor of Metallurgy at the University of Toronto, is perfecting a simple and cheap process of refining nickel.

Mr. C. W. Knight visited the Missouri-Cobalt properties at Frederickton, Missouri, during the holidays. Prof. S. F. Kirkpatrick of Kingston is directing the erection of a plant there for the treatment of ores containing lead, copper, nickel and cobalt.

Prof. J. C. Gwillim has returned to Kingston from Atlantic City and New York.

Prof. S. F. Kirkpatrick has returned to Kingston from Frederickton, Missouri.

Representatives from many of the iron and steel companies were in Ottawa last week.

Mr. F. N. Flynn, who was some years ago at Cobalt, has been appointed general superintendent of the smelting works at Trail of the Consolidated Mining and Smelting Co of Canada.

Mr. Fred T. Greene, Mining Engineer, of Butte, Mont. was killed on Christmas day when a train ran into his auto. He was distributing Christmas presents at the time. Mr. Greene was a graduate of the University of Toronto and of the Michigan College of Mines.

Captain J. J. Johns, shift boss at Murray mine, has been compelled by ill health to resign and go to the southern States.

G. G. S. Lindsey, W. G. Miller, E. P. Mathewson and R. E. Hore of Toronto were in Montreal on Saturday, January 12, to attend a meeting of the Council of the Canadian Mining Institute.

D. B. Dowling and Geo. Mackenzie of Ottawa were in Montreal, Saturday, January 12, attending a meeting of the Council of the Canadian Mining Institute.

A. A. Cole of Cobalt, president of the Canadian Mining Institute, was in Montreal on Saturday for a meeting of the Council.

D. B. Dowling of Ottawa and J. B. Tyrrell of Toronto, have been nominated for the presidency of the Canadian Mining Institute.

J. A. Dresser, H. E. T. Haultain and B. Neilly are nominated as vice-presidents for the Canadian Mining Institute. There are two vacancies owing to the retirement of Chas. Fergie of Montreal and T. W. Gibson of Toronto.

There will be no election for councillors of the Canadian Mining Institute this year.

Mr. W. Lancaster, for a number of years overman at the No. 2 mine of the Crow's Nest Pass Coal Co.'s Coal Creek colliery, was last month presented with a handsome watch, suitably engraved, he having resigned from the company's service on being appointed a district inspector of mines for the British Columbia Department of Mines. Colliery officials with some of whom Mr. Lancaster has been associated about twelve years, arranged for the presentation as an evidence of their esteem.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.**Kirkland Lake Gold.**

Operations at the Kirkland Lake Gold mine at Kirkland Lake have been curtailed for the time being and a greater portion of the working force have found employment at other mines in the camp. The outcome of the Temiskaming Mining Company's meeting, to be held on the 22nd day of January, will have an important bearing on the future operations of this mine. Should the Culver interests control the meeting, the proposal to take a one-half interest in the Kirkland Lake Gold might receive favorable consideration, and it is anticipated that an immediate resumption of work would result. Other rumors are to the effect that the curtailment of operations will continue for the duration of the war.

Elliott-Kirkland.

The additions to the mining plant of the Elliott-Kirkland have been completed and the work of sinking to deeper levels was recently commenced. The shaft, which previously had attained a depth of 300 ft., will be continued to the 500 ft. level and lateral work will be done at this depth. The westward continuation of the main vein of the Kirkland Lake Gold was encountered in a cross-cut at the 300 ft. level and determined to be approximately eleven feet in width and contained average values of around twelve dollars to the ton. The Elliott-Kirkland represents an honest mining endeavor which has every appearance of being crowned with ultimate success.

Machinery Installed at Wright-Hargreaves.

The installation of the new machinery at the Wright-Hargreaves mine at Kirkland Lake has been completed. A 200 h.p. motor together with a 12-drill compressor now ready for use, will serve to drive operations at greater speed than heretofore. The No. 2 main shaft of the Wright-Hargreaves has reached a depth of 300 ft., and the No. 3 shaft, some 850 ft. west, has been driven to a depth of over 100 ft., and will be continued to a depth of 300 ft., at which depth it is proposed to connect these two workings. After this work is completed a crosscut will be driven to tap the No. 1 vein, which in the early days of the Kirkland Lake camp was opened up on the surface and found to contain excellent gold values.

Canadian-Kirkland.

Along the south and newer zone, of the Kirkland Lake camp, is to be found the Canadian-Kirkland, the Hunton-Kirkland and the Ontario-Kirkland. Active development is being vigorously prosecuted on the Canadian-Kirkland and the property is standing up well under the test. Between this property and the Kirkland Lake Gold, lies the Honer property, on which the Temiskaming Mining Company are commencing operations, and this portion of the camp is receiving merited attention. A pleasing feature of operations throughout the Kirkland Lake camp has been the absence of stock jobbing except apparently in one or two instances. Considering the substantial production of the camp the reputation it now enjoys is indeed very enviable.

Kirkland-Porphyry.

The cross-cut at the 170 ft. level of the Kirkland-Porphyry mine at Kirkland Lake has been driven about forty feet south from the shaft and is said to

be in ore all the way. The orebody is cut with the mud-seam, which is characteristic of practically every mine in the Kirkland Lake camp, the only difference being that two such seams intersect the orebody of the Kirkland-Porphyry. These two mud-seams are about eleven feet apart at the 170 ft. level and the ore between them is said to run high even for the rich deposits of the Kirkland Lake camp. The remainder of the vein carried very substantial average values, and the latter grade of ore is still in evidence in the crosscut. The shaft is being continued to the 300 ft. level. So far the developments at this property have proven even more successful than the most optimistic had expected.

Coniagas.

At the annual meeting of the Coniagas Mines, Limited, held at St. Catharines, it was announced that half a million dollars has been paid in dividends during the past year, making a total distribution of dividends by the company to shareholders to date of \$8,740,000. The price of the product of the company was considerably higher than in former years which worked to the monetary advantage of the company. During the year about \$150,000 has been spent in prospecting work. So far President Leonard said, they have been unable to discover another silver property worthy of development. Much is expected however, from the Ankerite property in South Porcupine, known to be carrying gold values. In speaking of the development of the Coniagas mine, Mr. Leonard said the output of silver this year was 1,344,267 ounces as compared with about one and three-quarter millions the previous year. The total shipments of silver from the mine to date were over twenty-five and a quarter million ounces. The silver ore this year was mined and concentrated at a net cost of 21.36 cents per ounce. R. W. Leonard, St. Catharines, was again elected president.

McKinley-Darragh.

It is understood the method of regrounding the tailings for treatment in the new oil flotation plant at the McKinley-Darragh has not been found altogether satisfactory and a number of alterations will be made during the present cold weather. These alterations will not cause any additional delay, owing to the fact that it has been found more economical to wait until the present cold weather moderates. With the arrival of warm weather in the spring the new plant will be operated at full capacity. During the past year the McKinley-Darragh has yielded in the neighborhood of one million ounces of silver, which placed it in sixth place as a producer in the Cobalt camp. Underground operations at the mine are said to be of an exceedingly favorable nature, and a considerable quantity of the ore now being hoisted, is comparatively high grade. The annual statement of the company is expected to be of a very favorable nature.

Adanac.

During the month of December development work at the Adanac was pushed forward with excellent results. A little over 100 ft. of underground work was accomplished, the vein in the drift maintaining a uniform width. A small amount of high-grade ore is being encountered from time to time and gradually the drift is being continued north to the zone in which geologists have recommended the carrying on of development work. It would not be surprising if the next few weeks work was attended with important developments at this property.

Ore Shipments in December.

During the month of December eleven Cobalt mines shipped an aggregate of thirty-one carloads of ore, containing 2,377,708 pounds. The following is a summary of these shipments:

Mine.	Cars.	Pounds.
Dominion Reduction	8	655,000
McKinley-Darragh.	4	338,204
Coniagas	4	330,295
Buffalo	4	329,958
Nipissing	3	175,077
La Rose	2	167,317
Kerr Lake	2	120,396
Aladdin	1	87,000
National	1	67,179
Penn-Canadian	1	65,761
Trethewey	1	41,521

19,600,000 Ounces Silver in 1917.

The total production of the Cobalt camp for the year 1917 will approximate 19,600,000 ounces of silver. The average price of the white metal for this period has been about 81 1-3 cents per ounce. Thus the value of the output will fall not far short of \$16,000,000. There are approximately 3,000 miners employed in the mines of Cobalt and the pay roll for the year is estimated to aggregate about \$4,320,000. The cost of supplies is said to have been about \$3,000,000, thus making a total operating expenditure of \$7,320,000. This would leave a net profit of approximately \$8,680,000. Of this latter amount over \$5,250,000 has been distributed in dividends and the balance employed in an endeavor to secure other mining properties further north. The year has been one of much prosperity, in which the companies and their employees have each shared. With the close of the year the harmony existing between the men and the operators is highly satisfactory. The men are receiving the highest wages in the history of the camp and in return the efficiency of this large working force is quite satisfactory.

Bullion Shipments.

The production of bullion from the Cobalt silver mines continues large and heavier shipments are due to be made at an early date. The high grade mills are working at maximum speed, and more than ever in the history of the camp, the product of the mines is being shipped in the form of bullion. This form of shipping greatly reduces the cost of transportation. The total bullion shipped by the Mining Corporation of Canada alone during the current year amounted to well over four million ounces. The Nipissing is establishing a record second only to that of the Mining Corporation. The enormous output of these two huge silver mines is a big factor in the world's silver production.

Kerr Lake.

Kerr Lake holds third place in the production of silver in Canada during the past year, being exceeded only by the Mining Corporation of Canada and the Nipissing Mining Company. The November yield amounted to 205,552 ounces, which is at the annual rate of 2,466,264 ounces. The dividend payments for the year amounted to \$690,000, which is equivalent to \$1.15 per share, a Red Cross dividend of 15 cents per share having been paid on August 10th. To date the company has distributed dividends amounting to \$12.45 per share, which is close to 250 per cent. on the par value of the stock. The report of the company for the fiscal year recently ended estimated that the positive ore reserves in the mine contain 3,120,400

ounces of silver. This is a net value of \$3.07 per share. At the present rate of production the reserves would be sufficient for about a year and a half's operations. The silver produced during the fiscal year was 2,551,000 ounces or a monthly average of 212,612 ounces. Production costs during this period amounted to 26 3-4 cents per ounce, which is one and a half cents higher than in the previous fiscal year, due to higher costs of material and labor.

The stock holdings of the Kerr Lake Mining Company include 150,000 shares of Wettlaufer-Lorrain, carried on the books at 15 cents per share, and 837,000 shares of Caribou-Cobalt carried on the books at the dated December 28th, of the operation of the Company also developing under an option of lease and bond, a gold property in the Boston Creek area in Northern Ontario, known as the Mondeau claims located in Me-Elroy township, east of the Gold Leaf property. Reports from this property indicate that satisfactory results are being obtained, and this week it was reported that another claim had been added to the company's holdings in this township.

Bailey-Cobalt.

The dismissal of the appeal of Edwin Benson, of Chicago, former president of the Bailey-Cobalt Silver Mines in an endeavor to collect some \$89,000, which he claimed was due him, leads to the belief that an effort will now be made to reopen this old Cobalt property.

Nipissing.

During the month of November the Nipissing Mining company maintained production at the rate of a little over 10,000 ounces per day, and for the third time during the past year, exceeded three hundred thousand ounces for a thirty day period. During the month the company mined ore of an estimated net value of \$305,572 and shipped products from Nipissing and customs ore of an estimated net value of \$331,196. Underground operations for this month continued to be favorable and a number of new crosscuts were started at various places, most of them heading for new areas, several small veins have already been found and they will be drifted upon in the near future. Stopping operations on all veins continued to produce satisfactory results. A new intermediate level was started from the workings on vein 490. There is a favorable area between that vein at the fifth level and vein 98 at the fourth level, which cannot be explored to best advantage from any present level. About 200 ft. more of vein 490 at the sixth level was put in condition to receive stope timbers. Shaft 81, which was developing the Cobalt Lake fault vein was closed during the month. With the exception of a small amount of ore encountered in one of the drifts, results were disappointing. For the eleven months ended November 30th, the Nipissing Mining company produced \$3,018,280 worth of silver. Heretofore the greatest record attained by Nipissing was in 1913 when a net value of \$2,922,714.26 was received. Thus it will be noted that the value of the first eleven months' production of the past year exceeds that of any twelve months in the company's history by \$95,566 and by the end of December it is estimated the production will have reached upwards of \$400,000 more than in any previous year of the company's existence. The company have declared a five per cent. dividend, together with a five per cent. bonus, payable Jan. 21st next, to shareholders on record Dec. 31st. This disbursement calls for the distribution of \$600,000. When it is remembered that during 1917 the Nipissing has paid 30

per cent. in dividends, amounting to \$1,800,000, and with the distribution of the January bonus and dividend will have disbursed to the shareholders a total of \$17,740,000, the magnitude of this precious metal mine may be imagined. With the current price of silver well above the average price paid during the past year it would not be surprising if the present year would prove the most prosperous in the history of the company.

Temiskaming.

The affairs of the Temiskaming mining company are anything but happy these days, and the President Mr. F. L. Culver in a circular letter under date of Dec. 31st, asks for the support of the shareholders to block the efforts of Messrs Hamilton B. Wills and Max Morgenstern to gain control of the company. A special general meeting of the company has been called for the 22nd of the present month, and the result of this important meeting is being awaited with more than usual interest.

Schumacher.

With the increase in its milling facilities the Schumacher mine is gradually working into a position to be classed as among Porcupine's big mines. This property lies adjacent to the Hollinger and McIntyre and would appear to be in line for important developments. The main workings have reached a depth of 600 ft. With 160 acres situated on the south contact of the porphyry intrusion, which has made its two neighbors famous, this property possesses enormous possibilities. Before long the work of driving the main shaft to a depth of 1,000 ft. will be under way, following the lead of the other important mines. The orebodies on this property have shown a remarkable consistency, and in spite of the shortage of labor the management has kept the enlarged mill operating at capacity, and the cost of operating this property is said to compare favorably with that of the best mines in the camp. It is understood that the ore reserves have increased considerably at the Schumacher since the last annual statement was issued, and the mine is now in better condition than ever before in its history.

Porcupine, V. N. T.

At the 600 ft. level of the Porcupine V. N. T. a comparatively large amount of ore is being opened up. The mill is running to capacity and the value of the production is sufficient to pay all operating costs, inclusive of development work, and a net profit is resulting. Preliminary plans have been made for the installation of a new mill, when conditions become more normal, and the operation of the old mill will serve to finance the new installation. The new mill addition appears to be undoubtedly warranted by the results encountered in development.

McIntyre.

The shaft on the Jupiter portion of the McIntyre property will have reached the 1,000 ft. level before the end of the present week. New pumping equipment has been installed and will meet all requirements. The main drift of the McIntyre, which is headed for this point, is already 600 ft. over the Jupiter line. From the McIntyre shaft to the Jupiter shaft is almost one-third of a mile. The big new hoist installed at the Jupiter will permit of carrying operations to a depth of 2,000 ft. The main or No. 5 shaft is also being equipped with a hoist of similar capacity. The work on this property is being centralized in such a way as to allow of ore from the sixth, seventh, eighth and ninth levels to drop through ore passes to the tenth level, where it is passed from chutes directly into the

ore cars, trammed to the foot of the shaft and hoisted to the surface. Net profits at this property are now greater than at any previous time in the history of the mine, owing to the efficiency of operations.

Groch Machine for a Molybdenite Property.

A contract has been received for the installation of a Groch Centrifugal oil flotation plant of 30 tons capacity, on a molybdenite property about twenty miles from the St. Maurice Mines, near Amos, on the Transcontinental Railway. This system for the treatment of ore has proven successful in the treatment of molybdenite, graphite and the recovery of copper from sulphide for which it is eminently suited; but its application has now been extended to practically every known metal and in the recovery of silver it has proven highly successful. One of these machines has also been in operation at the Miller Independence Gold Mines at Boston Creek, where for the first time in Canada flotation had been successfully applied in the extraction of gold. Arrangements have also been made for the installation of a Groch machine at the McIntyre-Porcupine mines where the machine will be used in experimental work. The construction of this machine differs very materially from that of the Minerals Separation company and has been perfected by Messrs. Frank Groch and W. E. Simpson, of Cobalt. The machine is the product of Canadian inventive genius and is being manufactured by Knight Bros. & McKinnon, of Cobalt, under contract.

Fast Shaft Sinking at Ankerite.

Operations at the Ankerite property of the Coniagas Mining company are in full swing since the installation of the powerful mining plant. The contract for the three compartment shaft to a depth of 500 ft. is being executed at a record rate. A depth of about seven feet per day is being maintained in the execution of this work. If this pace is kept up it will require only about six weeks to complete the shaft to the 500 ft. level. Shaft sinking at the rate of 200 ft. per month has been exceeded in very few instances in any part of the world and demonstrates the increasing efficiency with which mining operations are being conducted in Northern Ontario.

Gowganda.

Shipments of high grade silver ore are being made regularly from the Miller Lake-O'Brien mine at Gowganda. According to the official figures of the T. & N. O. railway this company shipped 61,960 pounds of ore during the month of November.

Porcupine Crown.

The main orebody of the Porcupine Crown mine has been encountered in the crosscut at a depth of 1,000 ft. The average grade of the ore has not been ascertained as yet; but the width of the vein and the appearance of the ore is very similar to that on the preceding level where some of the richest ore yet encountered has been found. It is reasonable to suppose that in view of the favorable results being met with the ore reserves at the mine should exceed those of one year ago, which, after deducting practically all the low grade ore, amounted to \$1,050,000. The reason for curtailing production at the mine during the past year was solely the shortage of labor and the high cost of material, the physical condition of the mine being in no way a factor. With the ore reserves conservatively estimated at \$1,050,000 and a net surplus of about \$275,000 on hand the financial and physical condition of the Porcupine Crown may be considered very good. It is estimated that the net profits in sight from treatment of ore reserves will exceed \$500,000, and with the \$275,000 surplus the intrinsic value of

the company's issued capital of \$2,000,000 is upwards of 38 cents per share. It would appear from the present favorable development at the 1,000 ft. level that there are great probabilities of the main orebody continuing to a much greater depth than yet attained.

Nickel from Alexo Mine.

During the month of November the Alexo Mine at Porquins Junction shipped thirteen cars of nickel ore containing 1,066,900 pounds. This is about 160,000 pounds less than shipped during the month of October.

Trethewey.

The Castle property at Gowganda has been taken under option by the Trethewey Mining Company of Cobalt. The Castle is looked upon as one of the most promising properties in the Gowganda silver area as it is situated along the contact zone along which the Miller Lake-O'Brien is encountering its rich ore. The irregular trend of the Miller Lake-O'Brien vein leaves room for uncertainty as to whether it can be picked up on the Castle property. However, there are a number of other veins on the Castle which possess considerable merit. Early last fall a second-hand mining plant was purchased from the McIntyre mines and this plant is now being transported to the property.

Miller Independence

Milling operations at the Miller Independence Mine at Boston Creek have been suspended until the early spring owing to the scarcity of water. The supply of water was being drawn from an abandoned shaft and when this gave out the mill was forced to close down. Underground operations were suspended for the holiday season, but have been resumed again and will be carried forward with renewed energy.

Prospecting in Cane Township.

Work has been commenced on a group of three claims in Cane township, near Kenabeek station, by a company known as the Cane Silver Mines. Considerable exploration work has been done and several promising veins in which fair silver values occur have been opened up. Arrangements have been made to sink a shaft on one of the largest veins, and the work is now under way.

Good Reports from Lightning River.

Latest reports from the Lightning River district are of a highly favorable nature. The work of sampling the main vein of the discovery group is under way and is said to be proving very satisfactory. The trail from Kirkland Lake to the new gold field is in good condition, and further staking in the vicinity of the find is still going on.

Patricia.

The No. 1 shaft at the Patricia property at Boston Creek has reached a depth of 130 ft., according to latest advices received here. The vein is said to be widening out with depth. The gold content of the ore is high, running as much as 24 ounces to the ton. Work at the No. 2 shaft is also progressing satisfactorily having reached a depth of over fifty feet. Here also the mineralization is heavy and shows a tendency to increase with depth. The new mining plant is giving good results, four machines being used and a maximum speed is being kept up. It is stated that enough gold has been put in sight already on this property to pay for the installation of the plant and development work to date. This record has only been equalled by one other quartz mine on the American continent and that mine was the Croesus, in Munro Township.

The shafts on this property are headed for a depth of 200 ft. and should the ore depositions continue to that depth it is the intention of the management to install a small mill at the property this winter.

Murray-Mogridge.

Excellent results are attending the work in the south drift on the 200 ft. level of the Murray-Mogridge at Bourke's Siding. The full width of the drift is in ore, with only one wall showing. A crosscut is being made near the present face to determine the exact width of the vein at this point. The north drift is through the fault and the drills continue in good ore. The face at this point is somewhat shattered owing to severe faulting, but sampling taken about a month ago have satisfactory average values on this level, but values from the last thirty feet of drilling in the south drift have not been announced as yet, but judging by the appearance of the ore the values will average high.

BRITISH COLUMBIA.

Strike at Trail Declared Off.

Finding themselves without the support of the International Union of Mine, Mill and Smelter Workers, duly accredited representatives of which organization had after investigation found that the Trail Trades and Labor Council had no authority under the laws of the American Federation of Labor to call a strike; that the local union had violated the constitution of the organization to which it belonged, and the smelting works of the Consolidated Mining and Smelting Company of Canada at Trail was "fair," the men who had "walked out" declared the strike off and the company was asked to permit them to return to work, which it consented to do. It will be some weeks, however, before all departments of the company's smeltery and refineries will be again operating at similar capacity to that prevailing when the strike was called. The Trail News estimates that the strikers lost approximately \$216,000 in wages by the strike, which it says "was inaugurated to enforce the eight-hour day for some 450 men—machinists, carpenters, plumbers, pipefitters and day laborers. Further, that "the walkout occurred Nov. 15, a vote having been previously taken at which 352 men balloted in favor of the strike and 42 opposed. In other words, about one-fourth of the employees took the trouble to vote."

There was, in addition to the direct loss of wages to the strikers, that of the large number of miners, railway men and others who were deprived of employment during the period of the strike. Reviewing the whole field that was affected by the strike, Northwest Mining Truth expressed the following opinion: "Loss in one way and another has certainly reached a cool \$1,000,000, and, as far as we can see, for no good purpose."

Mining Companies' Dividends.

Dividends paid by companies operating metalliferous mines in British Columbia are stated to have exceeded \$3,000,000 for the calendar year 1917. Published details are as follows:

Consolidated M. & S. Co.....	\$ 996,503
Granby Consolidated Co.....	1,499,848
Hedley Gold Mining Co.....	240,000
Le Roy No. 2, Ltd.....	29,199
Rambler-Cariboo Mines, Ltd.....	35,000
Standard Silver-Lead Mining Co...	300,000
Utica Mining Co.....	64,000

Total for 1917\$3,164,550

The total for 1916 is shown to have been \$2,891,583, so that there seems to have been an increase for 1917 over 1916 of \$272,967. In the last-mentioned year, however, the Crow's Nest Pass Coal Co. paid dividends stated to have totalled \$372,756, but, so far as known, did not make any profit distribution in 1917, in which case the total of declared dividends from all mining companies operating in the province was nearly \$100,000 higher in 1916 than in 1917.

Copper and Coal Production.

It is reported that there has been a substantial increase in the quantity of copper produced by the Britannia Mining and Smelting Company in 1917, as compared with its production in 1916. If this be so it may make the total quantity of copper produced in British Columbia greater than in 1916, and add this metal to the two or three other metals estimated to have also made an increase. It will have to be a considerable amount, however, to offset the estimated increase in some other metals, notably lode-gold.

The quantity of coal produced in 1917 will probably be found to have been somewhat less than that in 1916. For eleven months ended November 30 the total production reported was 2,196,898 long tons gross, that is, including the coal made into coke. This total is 288,682 tons short of the quantity produced in 1916, an amount thought to be larger than the production for December will be found to have been. However, the decrease for the year is not likely to be more than 30,000 or 40,000 tons.

The French Zinc Recovery Process.

At a public meeting held in Nelson, West Kootenay, on December 19, under the auspices of the Nelson Board of Trade, a committee was appointed to draft a resolution to be forwarded to the Provincial Government, from which further financial aid is being sought with the object of getting into operation the zinc works at Nelson, designed to recover zinc by the French electrolytic process, the rights to which are held by the French Complex Ore Reduction Company. The Provincial Government has already guaranteed the company's bonds to the amount of \$40,000, which amount is understood to have been expended in altering and adding to the plant at the zinc works near Nelson, at which there has been in past years considerable experimentation in connection with the electric smelting of zinc-lead ores. The resolution since drafted urges the Provincial Government "if possible, to either secure entire control at the earliest possible date of the process, patents and all other property of that company, or to take steps to complete the necessary financing of that company in order to bring its plant at Fairview, near Nelson, to successful production." It was stated that the meeting believes that at the plant successful production was on the point of being attained. It was suggested that about \$25,000 is required to place the enterprise in the position of being a going concern.

Mining and Smelting on Vancouver Island.

The proportion of the total production of coal in the province during eleven months to the end of November, 1917, credited to Vancouver Island collieries is 71 per cent., which indicates that there has been much more activity at the Island mines during the year than at those of the Crow's Nest district. The Canadian Collieries (Dunsmuir) Limited comes first, with an output of approximately 740,000 long tons—471,000 from its mines in the Comox district and 269,000 tons from those at Extension. The Western Fuel Company's total for the eleven months was about 597,000 tons, and

that of the Pacific Coast Coal Mines nearly 141,000 tons. Other mines together produced about 85,000 tons.

Metalliferous mining is not yet resulting in the production of any considerable quantity of ore. The Ladysmith Smelting Corporation, however, is again operating the smelting works at Ladysmith, and is also doing some development work on the Willow Grouse group of copper claims at Sooke, in Victoria mining division. In the same neighborhood, the Margaret group is producing ore and shipping it to Ladysmith. Other Island mines are not shipping to Ladysmith.

INCREASING VARIETY OF PRODUCTS FROM CANADIAN STEEL PLANTS.

In an article written for the Annual Financial Survey of the "Globe," Mr. J. Frater Taylor, President Algoma Steel Corporation, says in part:

"It is intensely difficult to diagnose the general steel situation at the present moment on account of existing conditions.

"The situation in the United States has changed, not so far as intensity of demand is concerned, but on account of the new factors, such as control of output and prices in view of America's entry into the European war. Conditions in the United States have an intense bearing upon the situation in Canada, not only as regards consumers of steel, but upon steel plant operations as well. Everything of the nature of iron or steel and everything entering into the production of iron and steel, must now, of necessity, come under microscopic investigation, so that the proper uses of all materials vital for war purposes may be established. The inevitable consequence is that export licenses, priority certificates and so forth, are necessary, both in respect of internal consumption and of exports to Canada. It is indeed difficult to say what the precise effect will be upon the Canadian steel industry and upon the consumption of steel products in Canada, but unless one is well provided, delays would appear to be the least of the prospective evils to be faced, and the worst of these evils is the possible curtailment and stoppage of certain supplies altogether.

"To some extent—indeed to a considerable extent—Canada can become and should become self-supporting. At the Algoma Steel Plant many materials and articles hitherto imported are now manufactured and there is every probability that 'self help' will be still further developed, but there are propositions which no ordinary Canadian steel company would care to face, such as the installation and development of the great basic plants necessary for the production of certain classes of steel."

MURRAY MINE.

Good results are being obtained in developing the nickel-copper orebody at the Murray mine of British America Nickel Co. The underground work is disclosing ore, as indicated by the diamond drills.

WAREHOUSE AT MURRAY MINE BURNED.

Fire broke out at 7 a.m. in the warehouse of the British America Nickel Co. at Murray mine on Jan. 2. The warehouse, which was well stocked with supplies, was a total loss. The building was an old office building, which had been remodeled for use as a warehouse and construction office. While a considerable quantity of supplies was destroyed, no serious delay in construction is expected to result. The fire was caused by trouble with the heating apparatus.

:-: Markets :-:

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.

Jan. 11, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 12 cents per lb.
Lead, 9 cents per lb.
Tin, 85 cents per lb.
Antimony, 17 cents per lb.
Copper, casting, 31 cents per lb.
Electrolytic, 32 cents per lb.
Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Jan. 11, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$9.85 per ton.
Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York. cents.	London. pence.
Dec. 19.	85 ⁷ / ₈	43
" 20.	86 ³ / ₈	43 ¹ / ₄
" 21.	86 ⁵ / ₈	43 ⁵ / ₈
" 24.	86 ⁵ / ₈	43 ⁵ / ₈
" 25.	86 ⁵ / ₈	holiday
" 27.	86 ⁵ / ₈	43 ³ / ₈
" 28.	86 ¹ / ₈	43 ¹ / ₄

NEW YORK MARKETS.

Connellsville Coke—

Furnace, 6.00.
Foundry, 7.00.
Crushed, over 1-inch—
Beehive, 7.30.
By-product, 6.50.

Straits Tin, spot, f.o.b., none offering.

Copper—

Prime Lake, *23.50 cents.
Electrolytic, *23.50 cents.
Casting, *23.50 cents.

Lead, Trust price 6.25 cents.

Lead, outside, nominal, 6.50 to 6.75 cents.

Spelter, prompt western shipment, 7.82¹/₂ to 7.92¹/₂ cts.

Antimony—

Chinese and Japanese, nominal, 14.75 to 15.00 cents.

Aluminum, nominal—

No. 1 Virgin 98-99 per cent., 36.00 to 38.00 cents.
Pure 98-99 per cent. remelt, 34.00 to 36.00 cents.
No. 12 alloy remelt, 26.00 to 28.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.

Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00 cents.

Electrolytic, 55.00 cents.

Cadmium, nominal, \$1.45 to \$1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$130 to \$135.

Platinum—Pure, \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic), \$2.70.

Tungsten—

Wolframite, \$22.00 to \$24.00.

Scheelite, \$26.00.

Gravel Fluorspar: f.o.b. mines—

Prompt, \$28.00 to \$30.00.

Contract, year 1918, \$25.00.

Silver (official), 86¹/₈.

*Government price.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices—

Hot rolled, 31.50 to 33.00 cents.

Cold rolled, 32.50 to 34.00.

Copper bottoms, 39.50 to 41.00 cents.

(Shipments from stock 2c per pound extra.)

Copper rods—Base prices—

Round, 32.50 cents.

Square and rectangular, 33.50 cents.

Copper wire—Base prices—

Nominal, 27.00 cents.

Brass Products—base prices—

High Brass—

Sheets and wire, 27.50 to 29.50 cents.

Rods, 24.75 to 26.75.

Low brass—

Sheets and wire, 30.00 to 32.00 cents.

Rods, 30.75 to 32.75 cents.

Brazed tubing—

Brass, 34.75 to 36.75 cents.

Bronze, 39.75 to 41.75 cents.

Seamless tubing—Base prices—

Brass, 35.50 to 37.50 cents.

Copper, 38.00 to 40.00 cents.

Bronze, 42.50 to 43.50 cents.

Full lead sheets, 9.25 cents.

Cut lead sheets, 9.50 cents.

Sheet zinc, f.o.b. smelter, 19.00 cents.

A new journal devoted to the iron and steel industries is to be published in Canada by the Industrial and Educational Press, of Montreal. Prof. Stansfield of McGill University will be Editor-in-chief. He will be assisted by an expert in foundry practice, and will have the cooperation of the metallurgy section of the Canadian Mining Institute.

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange on January 10, 1918:

Gold.		
	Bid.	Asked.
Apex. . . . .	.05 1/2	.05 3/4
Boston Creek . . . . .	....	.24
Dome Extension . . . . .	.11	.12
Dome Lake . . . . .	.13	.14
Dome Mines	8.75	9.25
Imperial. . . . .	.02 1/4	.03
McIntyre.	1.47	1.48
Hollinger	5.00	5.05
Newray. . . . .	.48	.49
Porcupine Crown . . . . .	.23	.27
Vipond. . . . .	.16 1/2	....
Preston East Dome . . . . .	.02 1/2	.03 1/4
Teck-Hughes. . . . .	.47	....
West Dome. . . . .	.13 1/2	.14

Silver.		
	Bid.	Asked.
Adanac. . . . .	.11	.12
Bailey. . . . .	.05	.05 1/2
Beaver. . . . .	.25	.26 1/2
Ferland. . . . .	.10	.10 1/2

Coniagas.	3.25	....
Crown Reserve . . . . .	.20	....
Gifford. . . . .	.03 1/2	.04
Great Northern . . . . .	.04 1/2	.05
Hargraves. . . . .	.11	.11 1/4
Hudson Bay	36.00	....
Kerr Lake	5.10	5.40
La Rose . . . . .	....	.37
McKinley. . . . .	.58 1/2	.59
Nipissing.	8.20	8.45
Peterson Lake . . . . .	.09 1/2	.11
Right of Way . . . . .	.03 3/4	....
Seneca Superior . . . . .	.01	.02
Silver Leaf . . . . .	.01 3/4	.02
Temiskaming. . . . .	.24 1/2	.25 1/2
Tretheway. . . . .	.15	.15 1/2
Wettlaufer. . . . .	.04 1/2	....
Mining Corporation . . . . .	....	3.75
Provincial. . . . .	.47 3/4	.49

HISTORY OF DEVELOPMENT OF PETROLEUM INDUSTRY

At a meeting of the Toronto section of the Society of Chemical Industry, to be held at the Engineer's Club on Friday evening Jan. 18, Mr. Schorman, technical expert of the British American Oil Co., will present a paper on the history of development of the petroleum industry. Those who are interested in this subject and wish to attend the meeting may obtain further particulars from the Secretary, Mr. Alfred Burton, 114 Bedford Road, Toronto.

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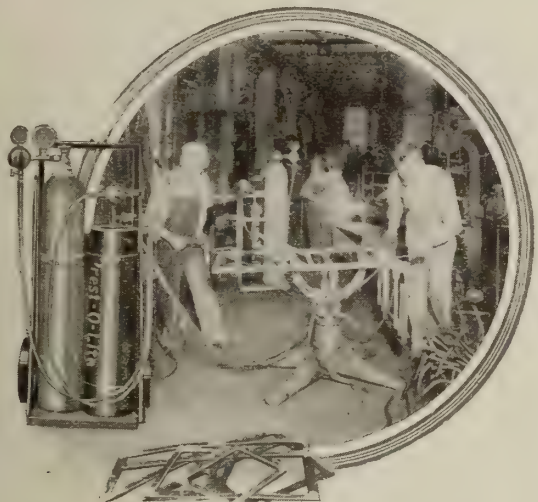
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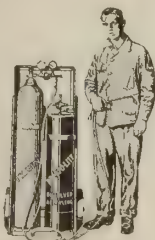
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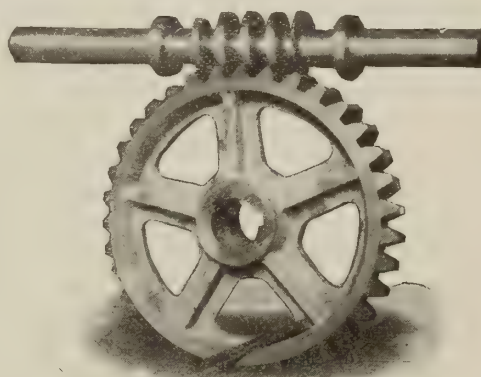
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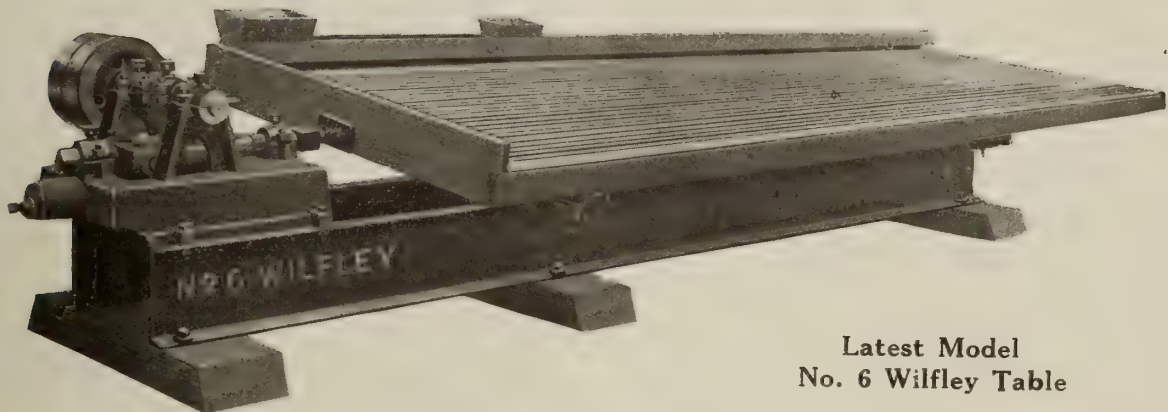
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HON. ARTHUR MEIGHEN, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same processs, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

(Signed) J. M. Callow.



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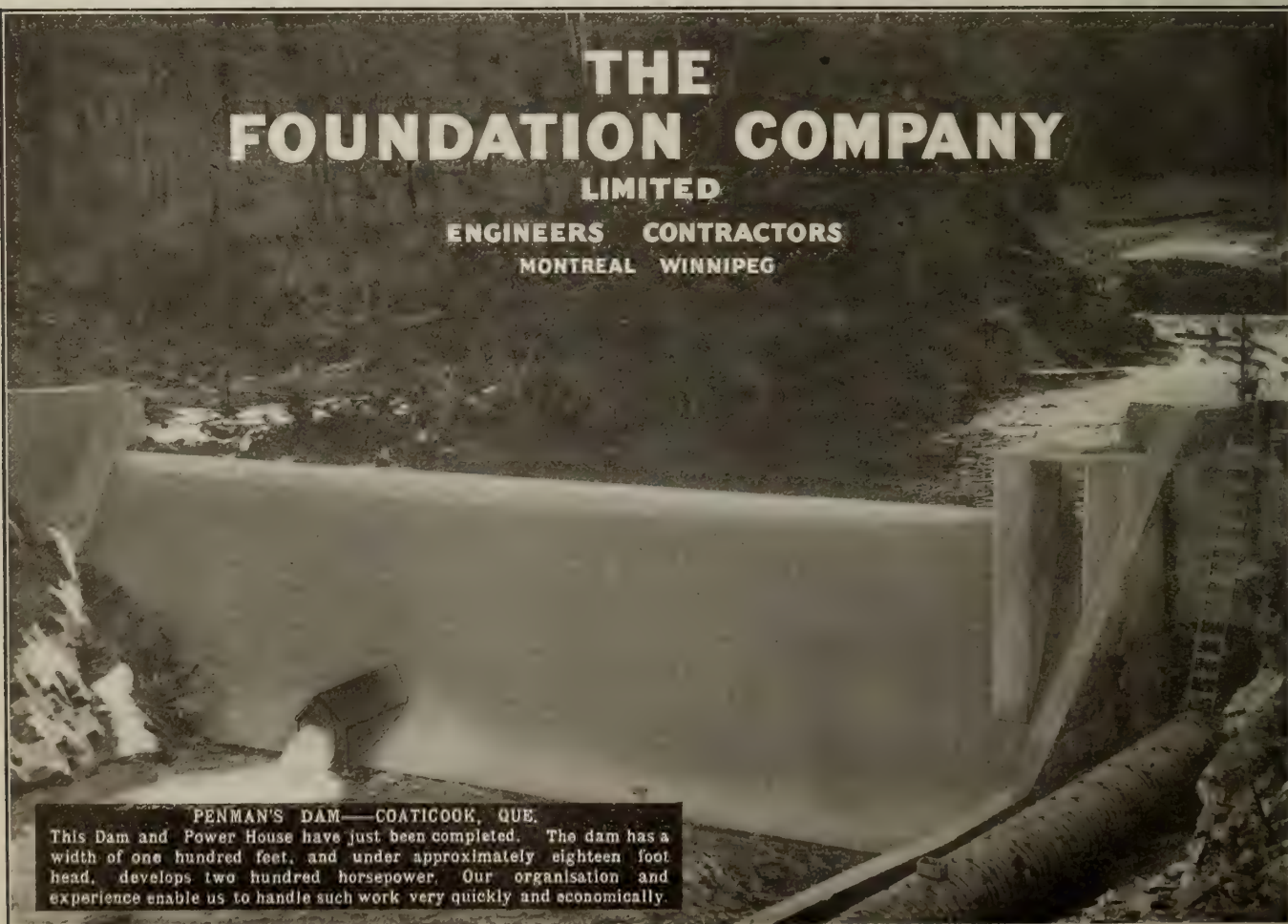
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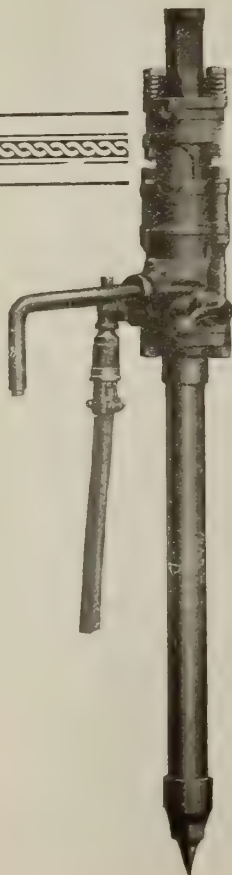
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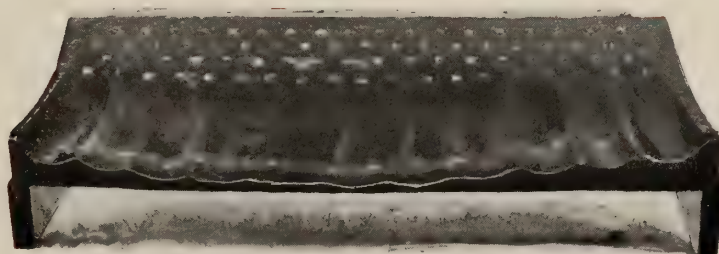
CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO

No. 3

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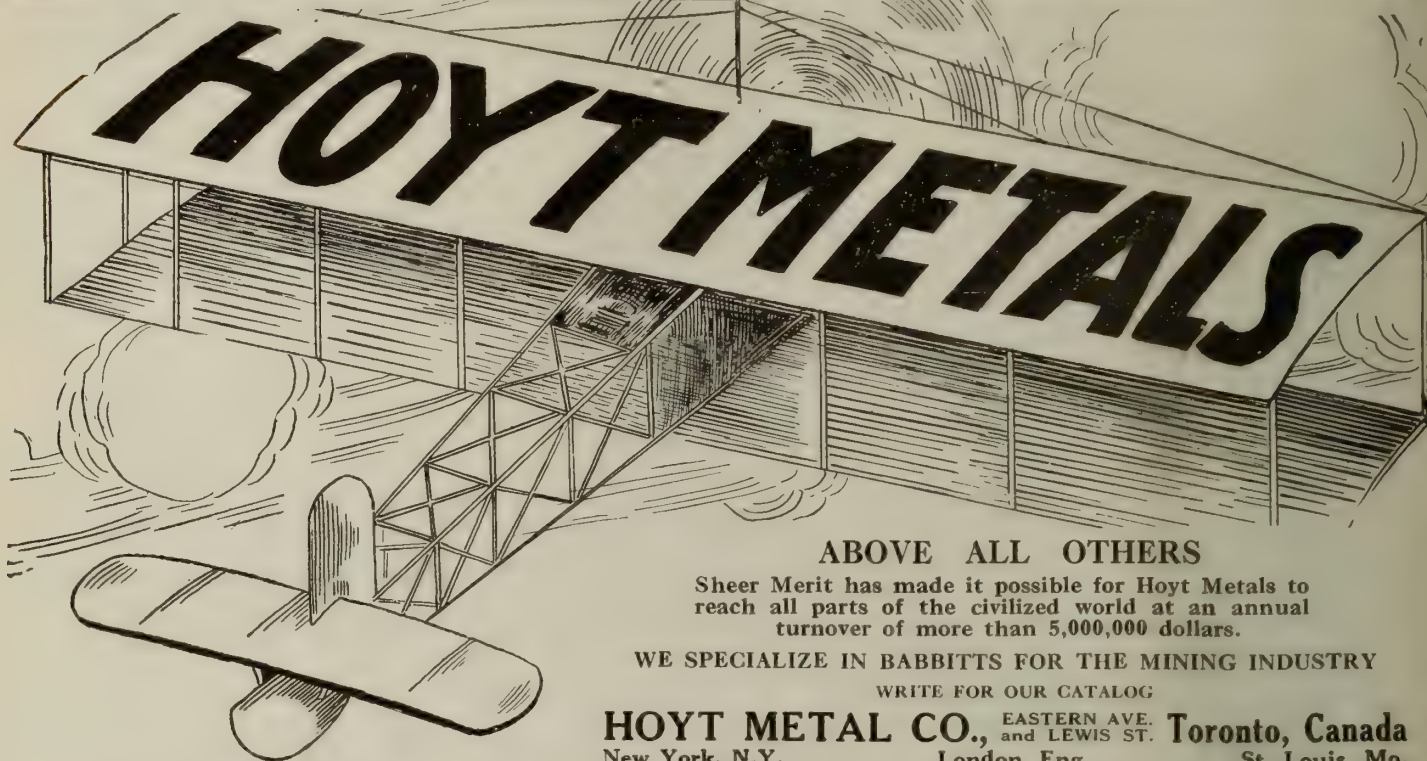
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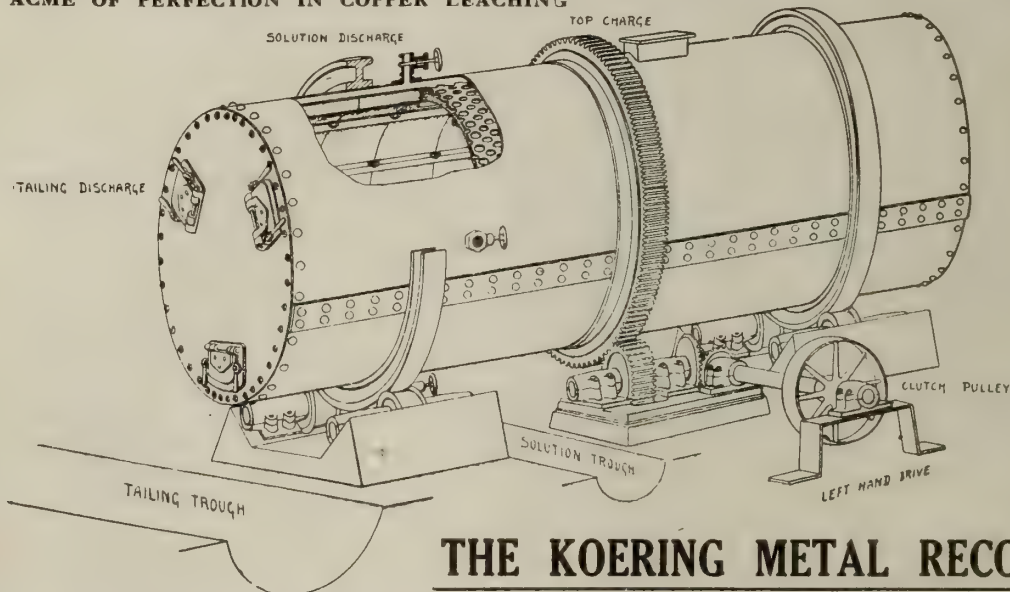
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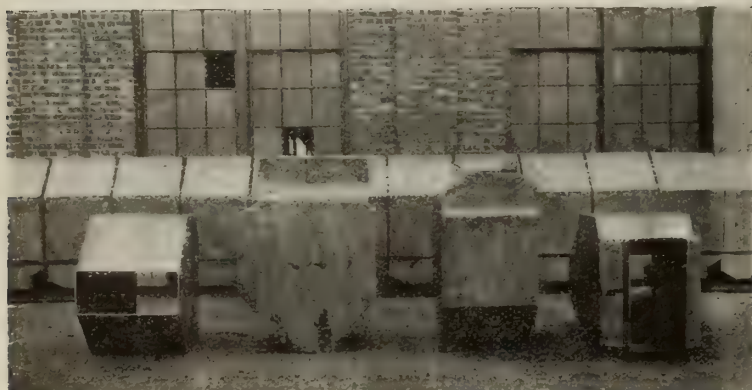
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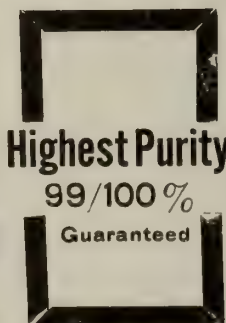
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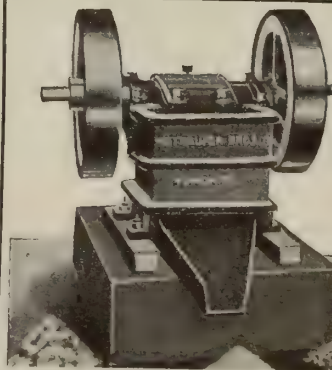
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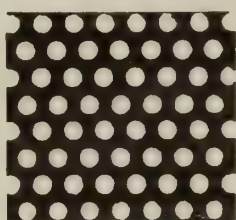
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The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

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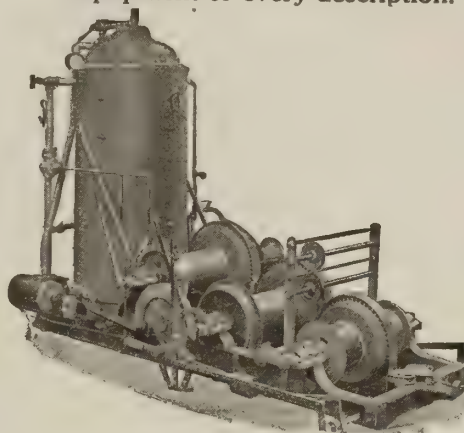
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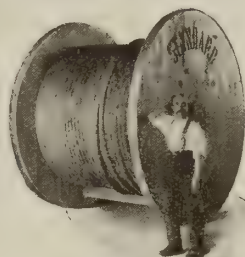
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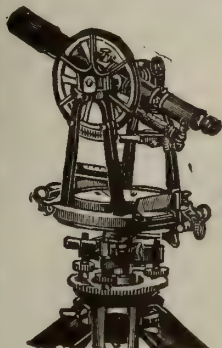
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, February 1st, 1918.

No. 3

The Canadian Mining Journal

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"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

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Branch Office - - - 600 Read Bldg., Montreal

Editor: REGINALD E. HORE, B.A. (Toronto).

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"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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There are many undeveloped coal deposits in the United States which might be developed by Canadians for consumption in Central Canada. Capital might be found in Canada for opening coal mines to supply the Canadian market if some assurance were given that the producers would be permitted to ship their product to Canada.

THE COAL SHORTAGE.

The public is now beginning to realize that an adequate supply of coal is a fundamental necessity in carrying on war. Early in 1915 the folly of neglecting to provide for the working of collieries to capacity was recognized in England and a Parliamentary Committee was appointed to enquire into the effect of recruiting mine workers. It was soon found that miners had responded in such large numbers to the call for volunteers that coal production was diminishing at an alarming rate. The committee advised that coal miners should not be taken from the mines.

Canadian coal producers early recognized the folly of recruiting miners; but for some time, doubtless because they believed it their patriotic duty, they refrained from calling attention to the result of encouraging these willing men to enlist. Two years ago, however, they decided it was their duty to state their views and they called the attention of the public and the Government to the seriousness of the situation and predicted the coal shortage which is now brought home to everyone. Prompt action might have greatly improved conditions. The disinclination to do anything to discourage recruiting, however, made the task a difficult one and there was great delay long after the facts were known. The damage has been done and yet we must now find means to produce and transport fuel in larger quantities than ever before.

There is plenty of coal of good quality in Canada and the United States. We may find it advisable to use peat and lignite in some localities; but the chief problem is the mining and transportation of the excellent coal which North America is fortunately endowed with. Shortage of miners and coal-carrying ships in Nova Scotia makes us more than ever dependent on the United States. Our American friends appear to be able to produce plenty of coal; but they are unable to get cars.

It would obviously be to the advantage of Ontario, which produces no coal, to find a substitute fuel. We have peat bogs which might be developed to advantage and there are indications that something will be done along this line. The simplest way to cut down our coal imports in Ontario is, however, to utilize our water powers. When the public ceases to be satisfied with raving about the beauty of Niagara Falls and is ready to utilize fully this source of power, situated so fortunately close to Ontario's great industrial centre, we can do without half the coal we are now importing. When Niagara Falls and the St. Lawrence are doing the work which they should do, and our railroads are electrified, there will be little need of coal for power purposes in Ontario.

An interesting pamphlet on "Carbonizing and Briquetting of Lignites" has been published by the Commission of Conservation, Ottawa. The report was prepared by Mr. W. J. Dick and contains data on the probable cost of carbon briquettes in Manitoba and

Saskatchewan, as estimated by R. A. Ross of the Honorary Advisory Council for Scientific Research. Mr. Ross estimated the cost at \$7 per ton on a basis of \$1 per ton for coal used. Mr. Dick estimates that the cost at Bienfait would be \$7.25 per ton of carbonized briquettes produced. Mr. Dick, allowing for a profit of \$1 per ton, estimates the price at various towns in Manitoba and Saskatchewan would be \$9.75 to \$10.15 per ton f.o.b. cars, which he points out is somewhat less than the price of U. S. anthracite in these towns.

A strange and regrettable feature of the report is the impression given that the district is dependent on the United States for its supply of high grade coal. Our enormous supply of excellent bituminous coal in the West is completely ignored in the report and the casual reader may imagine that the district is absolutely dependent on the United States for good coal. Mr. Dick says: "It is inconceivable what would happen if the exportation of hard and soft coal from the United States were prohibited." Considering that he is referring to a district that could readily be supplied with first class Canadian coal we cannot understand the purpose of such a statement.

The decision of the Mines Department to discontinue the concentration of molybdenite ores has created some consternation among those who are planning to work molybdenite deposits during the coming summer. It should be borne in mind, however, that the undertaking of custom work by the Mines Department was never intended to mean that the laboratories should be permanently used for such purposes. Mr. Mackenzie and his assistants investigated processes of treatment of molybdenite ores and then undertook to do custom work until producers should instal their own plant. For various reasons this custom work has been carried on longer than was expected and the Mines Department has thus been deprived for some time of the services of men and the use of laboratories needed for investigations. Unfortunately, those who have become interested in molybdenite production have assumed that custom work would be continued by the Mines Department. This being the case, some time will be needed to make necessary arrangements for concentration of ores from properties that will be opened up as soon as the snow has disappeared. Those who propose to begin development work this spring will not have much time to test their deposits before the only custom concentrator is closed.

According to cable messages from London, the British Government is making changes that should materially increase the efficiency of its Intelligence Departments. A new department will absorb several subdivisions of the Board of Trade and the Foreign Office. The status of Trade Commissioners is to be improved and the best men are to be obtained "from any source." Recent announcements indicate that more attention is to be given to Canada. Mr. Hamilton Wickes, senior British Trade Commissioner in Canada is to go to London and is to be succeeded by Mr. G. T. Milne. Mr. F. W. Field of Toronto, editor of the "Monetary Times" is to be appointed British Trade Commissioner in Toronto.

Mr. Field is an Englishman who has been in Canada for the past twelve years. He has earned a reputation as a leading authority on financial affairs in Canada and will be able to keep London well informed of conditions here.

CIVIL ENGINEERS CHANGE NAME OF THEIR SOCIETY.

It is difficult to see what advantage will accrue to the Canadian Society of Civil Engineers in the changing of its name to that of the Engineering Institute of Canada. The society has long borne a name similar to that of a society of high standing in Great Britain and to that of one in the United States. It would appear that such a well established name would carry more weight, not only in Canada but abroad, than would any new title. Abroad the new name will tend to be confused with that of such societies as the Amalgamated Engineers, who now are in the spot light in Great Britain and consist of stationary engineers and other mechanics.

The new name is not definite enough. Unlike that of the mechanical engineers, chemical engineers, et al, it does not indicate whether its membership represents a profession, a trade, or whether it is an organization for merely educational work, such as collegiate institute, Fraser institute, etc.

Heretofore, the Canadian Society of Civil Engineers has admitted as members only those men who were possessed of well proved professional qualifications. It has been strictly a society of professional men, and has not represented an industry as well as a profession, as does, for instance, the Canadian Mining Institute.

A few years ago it was proposed to change the name of the American Institute of Mining Engineers to one that would indicate that the membership embraced metallurgists, but the members would not agree to the change, preferring the name that during a period of forty years had come to be recognized with respect throughout the world.

The C.E.'s, in changing their name, appear to be working against the tendency of the age. Specialized effort during the last few decades has resulted in the formation of a number of engineering societies that have no official connection one with another. In the United States there are, for instance, in addition to that of the civil engineers, those of mining engineers, mechanical engineers, electrical engineers, and others. Some of these societies are composed entirely of professional men, while the membership of others represents both the profession and an industry. As time goes on there will not be fewer engineering societies, but more of them. Even at present in Great Britain there are two distinct societies, both under royal charter, whose members are associated with the mining industry. One of these societies, whose membership is entirely professional, deals with the whole industry with the exception of that of coal, while the activities of the other are chiefly concerned with this substance. In the United States one mining society is composed entirely of professional men, while the other great institute in its membership represents both the profession and the industry.

During the past twenty-five years the Canadian Society of Civil Engineers has attempted, at various times, to have laws passed in the provincial legislature making engineering a closed profession, like that of law or medicine. In this they were badly advised, as no legislature after due consideration would agree to such a backward and undemocratic step. Doubtless wiser councils will prevail in the renamed society and members who are inclined to grasp at the unattainable will be restrained.

While one cannot but regret the passing of the historic name of the society, like that of some great personality, let us hope for the prosperity of the newly christened organization.

So far as we know the decision of the Canadian Society of Civil Engineers to change its name is not because its officers are ashamed of the misleading propaganda which they have been responsible for during the past year. The society has not yet made amends for the false statements concerning the Canadian Mining Institute contained in a pamphlet which it published.

Canada has plenty of coal in East and West, both for ourselves and the Atlantic and Pacific States. Central Canada has no coal; but is conveniently supplied by coal-fields of the United States. We import far more than we export; but we can export far more if the United States wants it and if miners and ships for coast trade can be obtained.

COPPER PRICE FIXED AT 23½c.

Washington, Jan. 22.—President Wilson to-day approved the recommendation of the War Industries Board that the maximum price for copper fixed upon its recommendation by the President, and announced September 21, 1917, be continued in effect upon the same conditions until June 1, 1918. The maximum price under this action will be twenty-three and one-half cents per pound, f.o.b. New York, subject to revision after June 1, 1918, upon these conditions:—

That the producers will not reduce the wages now being paid.

That the producers will sell to the allies and to the public copper at the same price paid by the Government, and take the necessary measures under the direction of the War Industries Board for the distribution of the copper to prevent it from falling into the hands of speculators who would increase the price to the public.

That the producers pledge themselves to exert every effort necessary to keep up the production of copper to the maximum of the past, so long as the war lasts.



F. W. FIELD

British Trade Commissioner at Toronto

Mines Department Will Discontinue Custom Work

Mr. Geo. C. Mackenzie, Chief of the Division of Ore Dressing and Metallurgy, Department of Mines, Ottawa, in a letter dated January 16th, says: Subsequent to the decision of the Canadian Government that exports of molybdenite and tungsten will be licensed for shipment to France and the United States, the Testing Laboratories of the Department of Mines have been requested to undertake the custom milling of molybdenite ores for various private interests.

In view of the fact that the normal functions of the Testing Laboratories are interfered with to a considerable extent with such custom work, I have been instructed to inform you that shipments of molybdenite ores will be received for treatment **only until 31st July next**, in order that operators may have an opportunity of taking advantage of the market in the United States and France while undertaking the construction of their own concentrating mills.

Shipments of crude ore received for custom work will not be allowed to interfere with the routine work of the Laboratories and will only be accepted on the advice of the officer in charge of this Division.

The charges set forth in the attached schedule include unloading when ore is delivered on the railway siding at the testing plant and concentrating and assaying, but do not include charges incidental to packing and shipment of concentrates.

Concentrates and ores will be accepted at owner's risk and the Department does not hold itself responsible for loss through fire or accident beyond our control.

Concentrates will be delivered at Ottawa or shipped at owner's direction and expense on the receipt of a certified cheque covering all expenses due the Department in connection therewith.

Schedule of Prices.

Governing the milling of molybdenite ores and concentrates delivered F.O.B. Dominion Government Testing Plant, Ottawa.

Concentrates will be made upon the following terms:

- (1) On assay returns from samples dried at 212 deg.
- (2) Moisture will be deducted.
- (3) The treatment charge to be \$5.65 per ton of 2,000 lb. of crude ore.
- (4) Credit will be given for molybdenite only. No allowance will be made for molybdite or wulfenite.
- (5) Recoveries of molybdenite per ton of 2,000 lb. dry ore delivered railway siding, Mines Branch Testing Laboratories, Ottawa:—

For molybdenite ores containing—

- (a) Between 0.5 per cent. and 1 per cent. inc. for 70 per cent. of the total molybdenite content.
- (b) Between 1.1 per cent. and 1.5 per cent. inc. for 78 per cent. of the total molybdenite content.
- (c) Between 1.51 per cent. and 2.0 per cent. inc. for 84 per cent. of the total molybdenite content.
- (d) Between 2.1 per cent. and 2.5 per cent. inc. for 87 per cent. of the total molybdenite content.
- (e) Between 2.51 per cent. and 3.0 per cent. inc. for 90 per cent. of the total molybdenite content.
- (f) Between 3 per cent. and .. inc. for 92 per cent. of the total molybdenite content.

Many Lives Lost at Allan Shaft

Stellarton, N.S., Jan. 24.—No sign of life was heard to-day in the Allan shaft of the Acadia Coal Company's mine, where an explosion occurred last evening. The rescue workers managed to reach the upper levels, and there found fifteen bodies. The number of miners unaccounted for is 81, for whose safety little hope is entertained. Many of them are a thousand feet under the ground, and cut off from help from the outside by huge falls of coal.

The cause of the explosion is unofficially given as an accumulation of gas. One of the Government's inspectors entered the shaft this afternoon to begin an investigation of the disaster.

In the meantime every preparation has been made to look after any injured that may be rescued.

With the arrival of the special train from Cape Breton to-day with 32 experienced Draeger men and apparatus, more effective rescue work can now be done at the Allan shaft.

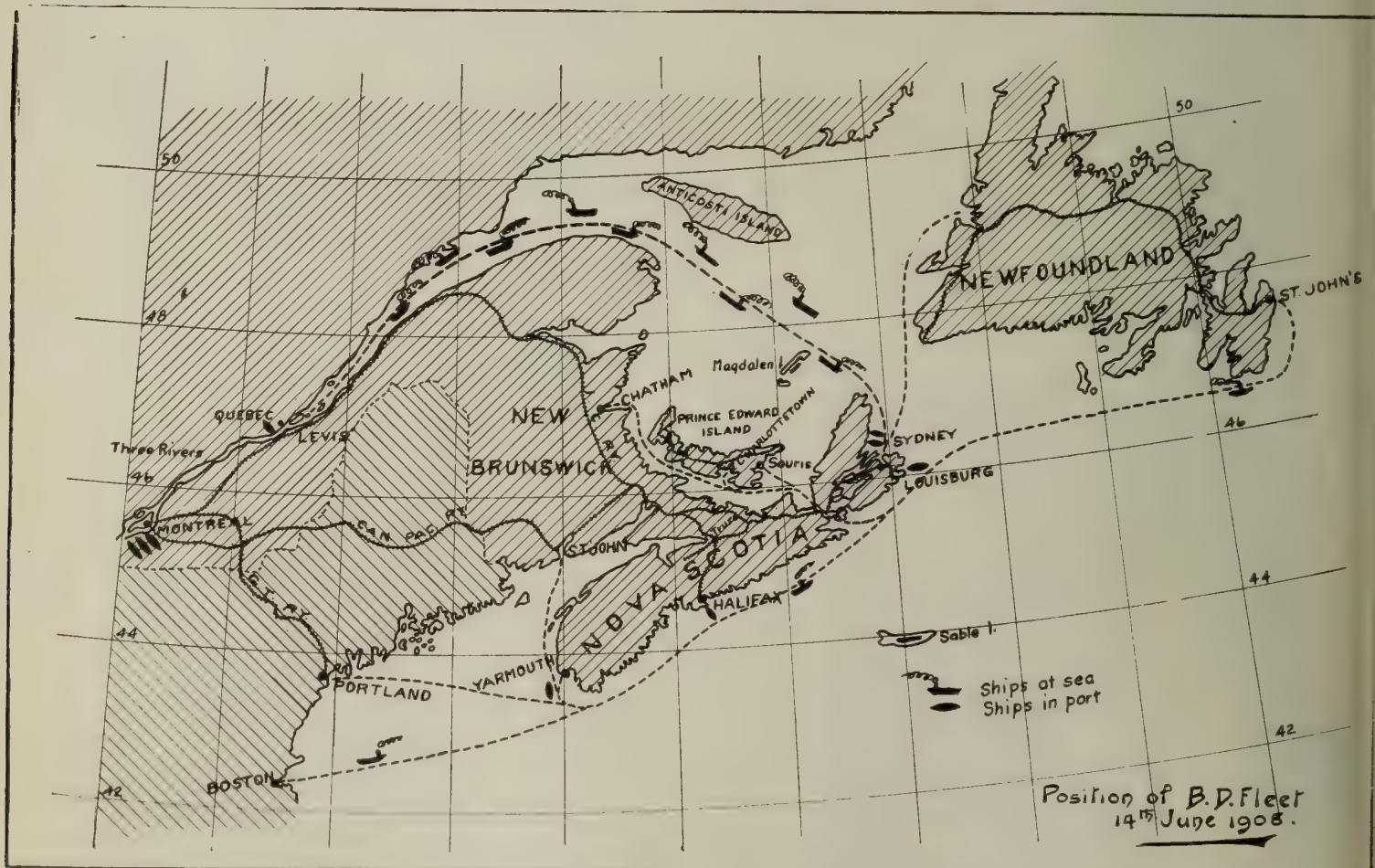
The rescue workers have been particularly warned to look out for fire, as it is suspected that behind the falls of coal may be raging furnaces.

Halifax, N.S., Jan. 24.—The death toll of the disaster at the Allan shaft, Acadia Coal Company's collieries, Stellarton, is now listed at 98. Company officials say that there were one hundred and five men in the mine at the time. Seven of these, on the first landing, escaped, and seventeen bodies have since been recovered, the last two having been brought out late this afternoon. Twelve of the bodies have been identified as miners belonging to Stellarton and Westville, three are Frenchmen, and the other two are unrecognizable.

There is now no gas in the mine, and the work of clearing away the debris is proceeding apace. A few small falls at the bottom of the shaft have been cut through, but there appear to be heavy falls ahead, and officials are unable to say when they will be able to reach the eighty-one men still in the mine. They have given up all hope of any of these men being alive, maintaining that all who were not crushed to death by the debris must have died of suffocation many hours ago.

The explosion at the Allan shaft has cut down the Pictou county coal output by 500 tons daily, and there is now some fear of a coal shortage there. The entire plant of the Nova Scotia Steel & Coal Co. has been closed down until Tuesday next.

An inquest into the disaster will be held to-morrow afternoon by Coroner Kennedy of Stellarton, and it is understood will adjourn until next week, when it will develop into a formal investigation.



SKETCH MAP SHOWING LOCATION OF THE COAL AND IRON INDUSTRY OF EASTERN CANADA

Newfoundland produces iron ore. Nova Scotia produces coal. The steel works are at Sydney and New Glasgow, Nova Scotia

VANCOUVER MAY HAVE STEEL PLANT.

Vancouver, Jan. 22.—The Province to-day has a despatch from Victoria which says an intimation was given by Hon. Wm. Sloan, Provincial Minister of Mines, that Vancouver might become the headquarters of a large electrical smelting and steel plant industry, and enter the world's competition for steel shipbuilding "on the same basis as Belfast and Glasgow."

"For several months past," the story continues, "it is said, the Government has been engaged in negotiations with Eastern capitalists and electrical smelter experts. The negotiations now have reached a point where the Government has agreed to join with the Pacific Steel Company of Eburne and the Aetna Iron and Steel Company of Port Moody—in which companies the Tudhope interests of Orillia, Ont., and R. F. Turnbull, a well-known electrical metallurgist of Welland, Ont., are identified, together with other interested parties—inviting an eminent outside metallurgist of international standing to visit Vancouver and make a final report on the proposal to establish a steel plant here. It is understood if the final report proves satisfactory the Government will extend the company its aid and influence."

This information, adds The Province, was confirmed by Hon. J. W. deB. Farris, Attorney-General. The Tudhope-Turnbull interests, he said, for some time had been active in sizing up the iron and steel situation on the Pacific coast.

Another short course in mining and associated studies has been commenced at the University of British Columbia, Vancouver, B.C., the instruction to extend over eight weeks. Similar short-course instruction in mining is popular in the Northwestern States, at Colleges of Mines in Washington and Idaho especially.

CHROMITE.

An important chrome deposit, recently discovered, is being developed near Richmond, Quebec, by D. B. Sterrett. Quebec is an important producer of chromite. Nearly all the chromite produced is exported to the United States where there is an excellent demand.

KAOLIN FOR FIREBRICK.

Development of the kaolin deposit at St. Remi d'Amherst, Quebec, has proven the existence of a large body of kaolin suitable for the manufacture of firebrick. The company's operations were begun with the intention of producing kaolin for china and pottery making as part of the deposit is suitable for this purpose. A very large amount of kaolin, not suitable for pottery making is available for fire-brick.

MOLYBDENITE.

The chief producer of molybdenite in Canada at present is the Dominion Molybdenite Company which is operating the Moss mine at Quyon, Quebec. The company has erected at Quyon a concentrating plant to treat 200 tons per day. It is understood that the development work has proven the existence of a large tonnage of low grade ore, averaging about 0.7 per cent. molybdenite.

United States Wants Chromite

According to the U. S. Geological Survey more chromite than is now obtainable is needed in the United States. A recently issued statement is in part as follows:

"The mineral chromite is the source of the metal chromium, which, as an alloy in chrome steel and in several chemical compounds, occupies an important place on the battle front on both land and sea. The compounds furnish the strong and durable yet subdued and protective colors that are used to dye the soldiers' khaki clothes and tan the upper leather of his shoes. Chromite readily forms alloys with iron and gives hardness to the steel that is used for armor plate on war vessels and for the armor-piercing projectiles which they hurl at the enemy. It is one of the essential elements in stellite, which is now so largely employed in making high-speed tools for cutting steel in the manufacture of munitions.

"Unfortunately for the United States the present domestic output of chromite is scarcely one-fourth of the quantity needed for war and domestic uses, so that the other three-fourths must be imported. Hitherto most of our imported chromite has come from Rhodesia and New Caledonia, and, notwithstanding the scarcity of ships, much of it still comes from those distant lands. In response to our call for chromite Canada has rendered us most efficient help. In 1916 she sent us 10,930 long tons and in 1917 she more than doubled her shipments of chromite to the United States. At present we are facing a deficit in the supply of chromite and we should spare no effort to increase the output of this country as well as that of adjacent countries.

"Most of the chromite we use is needed in factories in the eastern United States and on account of the difficulty and expense of long transportation from the western deposits one of our most urgent present needs is to increase the production of chromite in the Atlantic States. The chrome industry of America really began in the Eastern States. The mines of Maryland and Pennsylvania once supplied the world's chromite."

Twenty years ago, in January, 1897, a commencement was made to ship ore from the Le Roi Mine, Rossland, B.C., to the smelting works at Northport, the contract to send 75,000 tons to the smelter established at Trail early in the previous year by the late F. Aug. Heinze, having been completed. From the beginning of production, in 1894, to the end of 1897 the output of the Le Roi mine has totalled about 2,023,000 tons of gold-copper ore having a gross value of approximately \$26,000,000.

The Steel Co. of Canada will build an addition to its plant at Brantford, Ont., involving an expenditure of \$100,000. Extensions to the company's plant at Hamilton, Ont., are also under way, in addition to the coke oven plant which is expected to be completed by next spring. Although the company has large shell contracts on hand, more attention is now being paid to the development of business along ordinary lines, the extensions referred to being part of this policy. The shell plant at Montreal has been closed and the space will be utilized for other purposes. The shell plant at Brantford will be operated to capacity and shrapnel bars will be rolled at Hamilton.

The Electrolytic Process for Recovery of Zinc

In a paper presented at the Pittsburg meeting of the American Electrochemical Society, Oct. 3, Mr. Thomas French, of Nelson, B.C., said in part:

In the last two years a large quantity of high-grade electrolytic zinc has been produced in the United States and Canada, and at the present time many other plants are projected. In view of this rapid progress the question has often been asked: Will the older retort process of smelting be superseded by the electrolytic deposition of zinc?

The reply to this question is generally given in an unqualified negative, apparently justified by the rather unsatisfactory recoveries of zinc obtained by those who have adopted the electrolytic process. The poor recovery is attributed mainly to the difficulty of roasting the ore without the formation of ferrite of zinc, which is very difficult to dissolve in the acid effluent from the electrolytic vats, but also to the difficulty in dealing with the filtration of slimy acid and neutral solutions.

We hear of great variations in the amount of zinc that can be dissolved from the roasted ore. Sometimes a 90 per cent. extraction of the zinc in the ore is obtained, and at other times only half, or even less than that amount, from the same ore. The average recovery of zinc appears to be less than 70 per cent. by most of those engaged in the manufacture of electrolytic zinc from ores or concentrates containing about 40 per cent. zinc.

If an extraction of 90 per cent. of the zinc can at times be obtained, and at other times cannot be obtained from the same ore, then assuredly, sooner or later, the reason for the disparity will be found. That being so, and taking into consideration several weighty factors favoring the electrolytic process for the reduction of zinc from its ores, there is more than a strong probability that the retort process for the reduction of zinc is doomed in the near future.

In forming this opinion, one of the chief considerations is that electrolytic zinc is being produced either by lead or copper manufacturers, and may be considered to be a by-product. It is true that some of these manufacturers are treating customs ores, but this is only to take advantage of the very profitable price of zinc which has ruled for some time, and to fulfil large contracts. The primary reason for the erection of these electrolytic plants was to extract from their own ores the zinc which previously had either been wasted or not worked at all.

In the case of the lead smelter, especially those whose ores contain much zinc, it is imperative that the zinc should be extracted, in order that the lead may be profitably smelted. Before long a modern lead smelter will not be considered complete without the adjunct of an electrolytic zinc reduction plant, if it is within reach of electric power at a reasonable rate. The competition of this by-product zinc will itself seriously affect the output of the retort smelters.

With proper adjustment of the roasting furnace conditions, it is not a difficult matter to obtain extractions of 90 per cent. from ores containing 15 per cent. to 25 per cent. zinc, and in the latter case with as much as 25 per cent. of iron. As far as the author's experience goes, furnaces of the Wedge and Herreshoff type are admirably adapted to the roasting of this class of ore. A large Wedge furnace, with seven hearths and a di-

ameter of 22 ft. 6 in. is capable of roasting about 1¼ tons of this ore per hour, with unskilled labor, and gives a more satisfactory product than the smaller hand-rabbed furnaces. After roasting concentrates containing 45 per cent. zinc, there is little difficulty in extracting as much as 95 per cent. to 97 per cent. of the zinc.

The successful electrolysis of zinc from sulphate solutions has not been an easy matter, and it is only within recent years that the difficult problem of depositing high-grade zinc has been satisfactorily accomplished on a commercial scale. The principal requisite is that the electrolyte shall be quite free from certain impurities. The methods by which freedom from these impurities is assured are now very well understood, and with experienced superintendence there is little difficulty in obtaining a high efficiency in that part of the process.

When certain underlying principles are recognized, the difficulty encountered in dealing with the filtration of the acid and slimy solutions also largely disappears, although it has been a very serious one to the uninitiated. In the dissolving of the zinc from the roasted ore there is nothing which any competent chemical engineer can not undertake, and any other operations connected with the electrolytic process are either of little or no difficulty, or are common to the retort process.

In comparing the two processes, I do not think there is any more experience required in the electrolytic process than in retort smelting, and I shall not be surprised if within the next year or two the electrolytic is preferred as the simpler of the two. It is certain that, with the exception of the care of the electrical machinery, the commonest unskilled labor only is required to produce electrolytic zinc, whereas the retort process requires not only many physically strong, but also very skilled and highly paid men. The amount of labor necessary in the electrolytic process is, however, greater than that required in retort smelting, and also, as a general rule, the current to produce a ton of zinc costs much more than the gas or fuel to produce a ton of spelter. The electrolytic is as much dependent on cheap power as the retort process is on cheap fuel. The operation of roasting in Wedge Furnaces is, however, less costly than that in the special furnaces used for roasting the ore for retorting, in which nearly all the sulphur must be eliminated. The labor and power costs are in favor of the retort process.

Just as soon as the lead or copper smelter recognizes that a good extraction of zinc can be made from his zinc-lead or copper ores, we may expect him to erect an electrolytic zinc plant as an adjunct to his smelter, even though the price of zinc should fall so low that he can make no direct profit from the zinc, provided, of course, that he is favorably situated with regard to cheap power.

In Canada, and especially in British Columbia, there are vast quantities of complex ores and silver-zinc-lead ores, which it has not been possible hitherto to concentrate to much above 45 per cent. The retort process in Canada is impossible on account of the small supply of ore of sufficiently high grade. The concentrates are impure and therefore do not command a high price. These concentrates are, however, very easily treated by the electrolytic process. It is imperative that the British Columbia miner shall concentrate his ore in order to separate the valuable silver-lead contents; the zinc con-

concentrates are merely a by-product. The latter generally carry a considerable quantity of silver, of which 65 per cent. to 70 per cent. is paid for the United States smelters, after first deducting 6 oz. The price paid for the zinc is generally based on 5-cent zinc, \$17.00 to \$18.00 per ton being given for 40 per cent. concentrates. After deducting duty, penalties and freight to the nearest United States zinc smelter, the Kootenay miner received only \$5.00 to \$7.00 per ton for his zinc concentrates. An electrolytic plant using these concentrates will prove to be a very serious competitor to the zinc smelter who can treat only high-grade concentrates. Even though he were able to treat 40 per cent. concentrates as profitably as 60 per cent., the Missouri miner could not supply his 40 per cent. concentrates to the smelter at much under \$27.00 per ton. The electrolytic plant would thus have an advantage of about \$20.00 per ton in the cost of ore, which much more than compensates for the higher cost of production in that process.

It must not be forgotten that when zinc-lead ore occurs in veins it must be concentrated in order to separate the more valuable lead contents, whether the miner is able to dispose of his zinc concentrates or not. Many of them actually run the zinc down the creeks because there is no market for it.

There are, of course, the considerations of cheap electric power, the improvement in flotation methods of concentration, distance from markets, and many others, which affect the future of these rival processes, but I think it must be conceded that it is at least very doubtful whether or not the retort process will be able to survive the competition of the electrolytic process within a few years.

In the early part of January only four of the eight blast-furnaces at the Granby Consolidated Co.'s smelter at Grand Forks, B.C., were being operated. The local newspaper stated that there was plenty of coke obtainable, but the supply of ore was short, temporarily.

MR. W. E. SEGSWORTH SPEAKS ON VOCATIONAL TRAINING.

Addressing a representative gathering of the Canadian Credit Men's Association in Toronto, Mr. W. E. Segsworth, Administrator of Vocational Training in connection with the Military Hospitals Commission, Ottawa, gave an instructive narrative of the work that is being accomplished in fitting the disabled soldier to provide for himself.

Mr. Segsworth announced that the department had branched out from the original scheme, and inaugurated a system of industrial surveys, which had been introduced in the vocational training schools as far West as Winnipeg during the past month with wonderful results.

In this connection, officials of the department visit the various industries, in which many different kinds of machinery are in use, and make a close study of the outstanding features of each machine and its mode of operation. The re-educational work is still in the experimental stage in Manitoba, while in the schools in Toronto and Montreal marked progress has been made.

The Silver Market

Messrs. Mocatter and Goldsmid, the London precious metal merchants, in reviewing the silver markets for the year say that the outlook is too uncertain for any definite prophecies.

"As last year," this firm writes, "we anticipate large requirements for coinage, both in India and in Europe, and the amount required will probably again exceed the world's products, but as indicating a tendency on the part of the Governments of the allies to avoid, as far as possible, further purchases of silver during the continuance of the war, it is interesting to note that early in October the Italian Government issued a decree calling in one and two lire pieces. France, too, has since decided to call in all five franc pieces coined up to the year 1870, and to demonetize these coins, using the silver for the coinage of subsidiary pieces.

"Owing to the entire absence for some time of any speculation in silver, the necessity of keeping large stocks of silver in London to prevent a possible 'corner' has disappeared, and although there was at the beginning of the year a stock of about 6,800,000 ounces this has been materially reduced, and is now almost negligible. Shipments, however, have arrived with wonderful regularity from New York and Canada, for with the exception of the steamship *Laconia* early in the year, and the *Mineota*, in September, no steamer bringing silver to London has, to the best of our belief, been lost; truly a wonderful record, and one for which we have to again thank the vigilance of our navy and those of our allies. The largest shipments of silver, however, have not been across the Atlantic, but on the Pacific side, owing to the enormous transactions with China, which have been such a feature this year. China has undoubtedly been a seller on balance during the past twelve months, over 39,000,000 ounces having been sent from there to India alone, in addition to minor shipments to other ports. Since these shipments from China have only been replaced to the extent of about 25,000,000 ounces imported from San Francisco, it gives an indication of the steady flow of sycee and other forms of silver which find their way to Shanghai from the interior of the country, the stock of sycee in Shanghai at present being hardly less than at this period last year."

Messrs. Heron & Co., members Toronto Stock Exchange, 4 Colborne St., have issued their annual (11th year) Summary of Mining Statistics. The publication, which has been prepared with great care and accuracy is a very comprehensive one covering useful data in connection with all Mining Companies, the shares of which were traded in on the Toronto market during 1917.

NIPISSING MINES CO.

With a silver yield of slightly more than 4,000,000 ounces Nipissing during the past year maintained its normal output, while the higher prices which prevailed increased the gross value over 1916. Dividends were as in previous year, 30 per cent.

Higher wages and cost of materials combined to raise the average cost above the 24.13-cent level of 1916, but the advance was probably more than compensated by the higher price received for silver.

NITRATES*

By Hoyt S. Gale.

Nitrogen for use in manufactures and in agriculture is supplied principally in the form of nitrates, and as these salts, or the nitric acid derived from them, constitute the basis of practically all explosives, they are absolutely essential also to warfare. As they are among the chief salts used in chemical fertilizers an adequate supply of them affects directly the quantity and the quality of the food supply.

Nearly all the sodium nitrate marketed is obtained from extensive deposits in the desert region of northern Chile. Commonly a few thousand tons of potassium nitrate is imported by America annually from India, where it is artificially produced in "saltpeter plantations." Calcium nitrate obtained in Norway by artificial fixation of the nitrogen of the atmosphere has also been listed among the fertilizer materials marketed in America. The United States has been the largest purchaser of Chilean nitrate since the German market has been cut off.

Just after the outbreak of the European war the Chilean nitrate industry experienced a severe depression which has, however, been followed by gradual recovery. The cost of production at the mines has risen considerably, owing largely to the increased cost of labor and the scarcity and high price of fuel. The coal used for refining the nitrate has been obtained principally from Wales as return cargo in the nitrate vessels. Fuel oil from California is also used.

At present the dearth of shipping facilities and high freight rates have considerably increased the price of the nitrate in the countries to which it is exported.

Nitrate of soda exported from Chile, calendar years 1912-1915, in short tons: 1912, 2,748,124; 1913, 3,018,469; 1914, 2,035,707; 1915, 2,230,054.

Normal New York quotations for sodium nitrate, 95 per cent. pure, ranged from \$44 to \$52 a short ton in 1912 and from \$44.40 to \$52.40 in 1913. At the end of 1916 or early in the spring of 1917 sodium nitrate was quoted at \$75 a ton in Atlantic ports.

The U. S. import figures show a war-time stimulus, the normal annual domestic consumption of about 600,000 tons of sodium nitrate increasing to more than double this amount in 1916. Of this large increase between 100,000 and 200,000 tons is believed to be in storage as a reserve for the time when access to a foreign supply may be cut off. The remainder of the increase, probably 600,000 tons, may be assumed to have gone into munition manufacture, chiefly for export.

The amount of nitrates consumed in fertilizers is not known exactly, but about 280,000 short tons (250,000 long tons) of sodium nitrate was used in 1916 for direct application to the soil as fertilizer. It is said to be applied chiefly as a top dressing, by itself, to promote or hasten growth at certain seasons, usually in the spring, after the crop has made a start.

A very important use for sodium nitrate is in the manufacture of sulphuric acid by the chamber process. In this process, by which the greater part of the acid of low gravities produced in this country is made, the nitric acid is required for the oxidation of the sulphurous gases to sulphuric form. The weight of sodium nitrate used in this way is estimated to be about 5

per cent. of the weight of the sulphur consumed to make the sulphuric acid. The production in 1916 of 4,500,000 tons of sulphuric acid of strengths less than 66 per cent. Baume therefore required 75,000 long tons (nearly 85,000 short tons) of sodium nitrate.

Fixation of Nitrogen.

The processes for fixation of atmospheric nitrogen that have been developed in a practical way may be classified as the arc processes, the Haber process, and the cyanamid process. Arc processes involve direct oxidation by means of the electric arc to form nitric acid and nitrates. These are fundamentally the simplest but are limited in application by the great amount of electric power required. Norway, with abundant water power, has been able to employ these processes successfully, but it seems doubtful if the power available in the United States could be spared for use in this way. The Haber and cyanamid processes form other compounds of nitrogen, which, however, can be converted into nitrates by a further process.

The Haber process consists in forcing gaseous nitrogen and hydrogen to combine under high pressure, a reaction being effected with the aid of a catalytic agent. This process yields ammonia, which would have to be converted to nitric acid, at least in part, to supply munition requirements, but which could be used in agriculture by conversion into ammonium phosphate or sulphate. This process, together with one for obtaining ammonia from cyanamid, is used at present in the production of nitric acid for munition supplies and inorganic nitrogen fertilizer salts in Germany, and these industries are believed to have been developed to such a degree as to render that country entirely independent of outside sources of nitrates when the war requirements cease.

The cyanamid process consists in the production of a compound of lime, nitrogen, and carbon, known as calcium cyanamid. It involves two main steps, each based on electric-furnace treatment but requiring only about one-fifth the power expenditure of the arc process. It is said that calcium cyanamid must be converted into ammonium salts to meet the requirements of nitrogen-carrying mixed fertilizer. An additional step would be necessary to convert the product to a nitric form.

By-product ammonia, derived from the production of coke and of illuminating gas, is an important source of combined nitrogen and is an available source for the production of nitric acid or nitrates. Such ammonia can be practically oxidized to nitrates, and the supply of this material is therefore available to relieve emergency requirements should other sources fail.

Mr. H. Freeman of the American Cyanamid Co., at a recent meeting of the Board of Trade of Niagara Falls, Ont., said:

"The establishment of the first, and at present only factory for the fixation of atmospheric nitrogen in America or the British Empire at Niagara Falls, Canada, by this company, was due to the failure of negotiations for the development of hydro-electric power in the United States, and to the cheap power offered at that time in Canada. When in 1913 capital was obtained in London for the extension of the industry to Alabama, where it was originally intended to go, similar conditions prevailed and the Canadian plant was extended by the expenditure here of some millions of dollars.

"Since the commencement of operations in 1909 the American Cyanamid Company has energetically sought the maximum development of the possibilities of cyanamid in many fields and at this plant a great amount of technical work has been carried on under the direction of Dr. W. S. Landis, and the use of cyanamid has been extended into many arts. The plant is up-to-date in every respect. Its employees are better paid than those of any other similar factory, and their welfare is taken care of by a very efficient safety committee, whose endeavors have made conditions of working far better than those in the majority of chemical factories.

"The raw materials used in the manufacture of cyanamid are the atmosphere, lime and coke, and to bring them into the proper combination a plentiful supply of electric power is required."

MORE ARSENIC NEEDED.

The shortage of arsenic and arsenic compounds that became apparent late in 1916 continued throughout 1917, according to a statement of J. B. Umpleby made public by the United States Geological Survey, Department of the Interior. It now appears that the United States needs about 12,000 short tons a year, whereas the available supply in 1917 only amounted to 9,787 tons.

In December, 1917, the manufacturers of insecticides, in response to a detailed canvass made by Mr. C. W. Merrill, of the Food Administration, estimated that they needed, for delivery before June, 1918, 6,900 short tons. Of this amount 5,476 tons had been contracted for and only 2,100 tons had been delivered. The manufacturers of sheep dip, in reply to inquiries made by the Department of Agriculture, estimated that they needed 1,000 tons. It is highly desirable also that some arsenic be exported to certain agricultural countries whose excess production is available to the allied governments. At present it is not known to what extent arsenic may be utilized in preparing poisonous gases for use in trench warfare.

The price of white arsenic in New York, as quoted by the Oil, Paint, and Drug Reporter, ranged from 8 cents a pound in January to 20 cents in May, and fell to 16 cents in December. Even at these prices, however, deliveries are said to have been far behind the stipulations of the contracts. It is understood that the maximum price for wholesale lots during the year was 16 cents a pound.

Last month The Trail News made the following comment: "During the recent strike at the Consolidated Mining & Smelting Co.'s smelter at Trail, B.C., the office staff had the time of their lives, albeit a new experience and a healthy one. Having completed totaling figures and making segregations re pachucas, motor generator sets, acids, metals and a few hundred other matters, they donned their overalls and went to work unloading cars of ore, coal, coke, etc. When that was done they increased their muscular exercise by loading pig lead and other metals of various kinds. While a bit strenuous at first, perhaps, it doubtless did them good and got them away for a time from their usual sedentary walks of life. And they never had better appetites, going back to their ledgers and adding machines when the strike was over with a new zest.

PERSONAL

Mr. J. B. Tyrrell, of Toronto, has been awarded the Murchison medal of the Geological Society, London, for recognition of his work as a geologist. Dr. A. P. Coleman, of Toronto, was awarded the medal a few years ago.

Mr. Van H. Smith has returned to Copper Mountain, B.C., from San Francisco, California, where he spent some time in the offices of Messrs. Bradley, Bruff & Labarthe drafting plans for the 3,000-ton flotation concentration mill to be erected and equipped by the Canada Copper Corporation at a site near Similkameen River, and about four miles above Princeton, B.C.

Mr. Oscar V. White, of Sandon, B.C., superintendent for the Slocan Star Mines, Ltd., has been ill as a result of ptomaine poisoning.

Mr. James J. Warren of Trail, B.C., managing director of the Consolidated Mining and Smelting Company of Canada, Ltd., in his last annual report, stated that the members of the company's staff on September 30, 1916, the end of the company's fiscal year, were as follows: Assistant General Manager, Mr. S. G. Blaylock; Metallurgical Manager, Mr. E. H. Hamilton; Manager of Mines, Mr. W. M. Archibald; General Superintendent of the Smelter and Refineries, Mr. F. N. Flynn; Comptroller, Mr. T. W. Bingay. The Manager of Mines stated that Messrs. M. E. Purcell, G. H. Kilburn, and H. L. Batten were engaged in examination and exploratory work, and that the operations of the various mining properties of the company were directed by the following other members of the staff: Centre Star and War Eagle, Rossland, Mr. E. G. Montgomery; Le Roi and White Bear, Rossland, Mr. F. S. Peters; Sullivan and St. Eugene, East Kootenay, Mr. J. K. Cram; Highland, Ainsworth, Mr. L. W. Oughtred; Molly Gibson, Nelson mining division, Mr. Ronald Stomier; Ottawa, Slocan City mining division, Mr. D. Matheson; Lucky Thought, Silverton, Slocan, Mr. D. M. Tattrie; Emma, Boundary district, Mr. Edward Nordman; Coast Copper Co., operating in Quatsino mining division, Vancouver Island, Mr. Wm. Clancy.

Mr. Wm. Thomlinson, of New Denver, B.C., who was employed by the Dominion Government to collect British Columbia minerals for inclusion in Canada's exhibit at the big expositions held in recent years at San Francisco and San Diego, California, and was in charge of the mineral exhibits at those big fairs, has contributed to The Daily Colonist, Victoria, an article in which he advocates that prospectors be certified after due training. Another of his contributions favors the employment of the Indians of British Columbia as prospectors.

ASBESTOS.

The demand for asbestos continues good and there is great activity at the Quebec asbestos mines. In addition to the regular producers several old mines have been reopened in the Broughton district.

GRANBY CONSOLIDATED.

For a winter month December established a record for the Granby Co. in the treatment at its Anyox smelter of 90,000 tons of ore.

Mineral Production of British Columbia in 1917

British Columbia's mineral production in 1917 aggregated in value \$37,182,570, compared with \$42,290,462 in 1916, a decrease from the latter year of \$5,107,892, according to figures compiled by Mr. W. Fleet Robertson, Provincial Mineralogist, and published in the annual preliminary review and estimate of mineral production, issued by the Department of Mines, just off the Government press. The detailed figures showing the production of various minerals and their value are as follows:

	1916		1917	
	Quantity.	Value.	Quantity.	Value.
Gold, placer.....		\$580,500		\$550,000
Gold, lode.....oz.	221,932	4,587,334	118,239	2,444,000
Total gold.....		\$5,167,834		\$2,994,000
Silver.....oz.	3,301,923	2,059,739	3,069,021	2,372,353
Lead.....lb.	48,727,516	3,007,462	38,661,811	3,054,283
Copper.....lb.	65,379,364	17,784,494	51,416,617	16,693,037
Zinc.....lb.	37,168,980	4,043,985	33,776,335	2,550,113
Total value of metalliferous.....		\$32,063,514		\$27,663,786
Coal.....tons	2,084,093	\$7,294,325	2,160,417	\$7,561,460
Coke.....tons	267,725	1,606,350	159,554	957,324
Total from collieries.....		\$8,900,675		\$8,518,784
Miscellaneous, building materials, etc.....		\$1,326,273		\$1,000,000
Total value of production.....		\$42,290,462		\$37,182,570

Summarizing the mineral situation throughout the past year, the report says:

"The decrease in total value of the 1917 mineral production as compared with that of the previous year would appear at first sight to show a very serious decline in the mining industry; this condition, however, was not due to any decline in mining itself, but to the cumulative effect of several adverse influences acting on the mining industry as a whole. It must be remembered that the year 1916 was a record one of demand for metals, which, therefore, made that year a banner one for mining, not only for British Columbia, but for the whole American continent. In comparing the estimated 1917 production with any previous year, excepting 1916, it is seen that the 1917 output easily exceeds any other; for instance, it is nearly \$5,000,000 greater than the former record year of 1912.

The adverse influences which retarded mineral production in 1917 may be summarized as industrial troubles, reduced metal prices in the last quarter of the year, a very much lessened demand for lead and zinc for munition purposes, and the economic conditions which severely handicapped the mining of gold.

"Industrial troubles in 1917 were more frequent and extensive than usual; in the early months of the year a protracted strike in the Crow's Nest district not only cut down the output of coal and coke but forced the copper and lead smelters to close for lack of fuel, and, as a direct cause, interfered with metal mining.

This strike was followed by another one at Rossland,

which stopped production from the big gold-producers of that camp.

"The great decrease in gold production this year is mainly due to the heavy falling-off in the Rossland output, which usually makes over one-half the yearly output of the Province. Early in November another serious strike occurred at the Trail smelter, which closed the whole plant until practically the end of the year; this in turn stopped productive mining during that time throughout East and West Kootenay.

"The reduction in metal prices was confined mainly to lead and zinc, as the average price for copper was practically the same as for the previous year, while

silver advanced in price. A larger production of lead, however, could have been made by the Trail smelter but for the inability to market the product, due to the curtailment of orders by the Imperial Munitions Board.

"Gold-mining suffered also from increased costs of labor and supplies, with no corresponding increase in the value of the metal produced, thereby causing a smaller margin of profit, and, in many cases, making it unprofitable to mine gold.

"But for these untoward circumstances the hope anticipated at the commencement of the year, that the mineral output of the Province for 1917 would reach the \$50,000,000 mark, would probably have been realized. Taken in the aggregate, our mineral production and development in the year 1917 and the future prospects of the industry are conditions for congratulation at this time.

"In 1914 the average market price of copper for the year was 13.6 cents; in 1915 it was 17.3 cents; in 1916, it was 27.2 cents; and in 1917 it was 27.18 cents. The 'high-water mark' for the year was in February, when the high monthly average of 31.75 cents a pound was reached; a steady, although somewhat irregular, decline thereafter set in. In September the United States Government, after conferring with the representatives of the big copper-producers, fixed a price of 23.5 cents a pound, and since that time this price has prevailed as the standard on the New York market; the New York price in turn is standard for the American continent, as sales and ore-purchases are governed

by it. This fixed price is apparently satisfactory to all, as the present supply and demand are about equal.

"The lead market is at the present time in a very dull and featureless condition. The high price prevailing for lead during the first nine months of the year so stimulated production that the supply soon exceeded the demand, with the natural result that stocks accumulated and the price commenced to decline. In Canada the chief producer of lead is the Consolidated company at Trail, which company delivered a large part of its output to the Imperial Munitions Board. Towards the end of the year, however, these orders were largely reduced, which caused the Trail company to have difficulty in marketing its lead; as a result the company had to curtail lead production.

"The high prices paid for zinc in 1915 and 1916 resulted in such an increased production that the supply far exceeded the demand, with the inevitable result that the market price declined very materially in 1917. The present market price of zinc of from 7.5 to 8 cents a pound cannot be considered as being any better than the before-the-war price, when it is remembered that operating costs are correspondingly higher. The average price of zinc for the year 1917 was 8.884 cents a pound (December estimated), which compares with 12.804 cents in 1916 and 13.23 cents in 1915. The Provincial output of zinc for the year 1917 is, however, only slightly less than in the previous year.

The value of coal produced in 1917 shows an increase of \$267,135 as compared with the previous year, but the coke production shows the large decrease of \$649,026. The coal production in the Coast District was considerably greater than in 1916, but labor troubles materially decreased the output in the Crow's Nest of both coal and coke; it is in this latter district that most of the coke production of the Province is made.

"As far as can be ascertained at present, there is a small decrease in the item of building materials, due to the cessation of building operations in the larger cities.

Gold production in all forms has suffered from the war, due to the increased cost of labor and supplies, while the price of the product remains stationary. Due to the greatly enhanced value of the baser metals such mines operating on the sliding scale of wages, regulated by the price of the metals, have been paying abnormally high wages, which have drawn miners away from the gold-mining, both placer and lode. The estimated production of gold, in ounces, for 1917, compared with 1916, was as follows:

Rosslund, 32,416-129,790; Boundary-Yale, 59,685-76,230; Nelson, 1,284-107; Skeena, 17,511-3,806; Coast, 2,612-3,204; Lillooet, 3,000-2,625; all other districts, 1,731-2,170. Total, 118,239-221,932 ounces. The fact that the Rosslund camp was closed down for a considerable portion of the year made a great decrease, as may be seen by the above figures.

Silver, while showing a decrease in quantity, was greater in value than in 1916 owing to higher prices for the metal, the high price being 100.74 cents in September, but since then dropping off to 85.5 cents, the average for the year being approximately 81.38 cents compared with an average in 1916 of 65.66 cents and 49.68 cents in 1915. The approximate silver production in 1917 was as follows: Slocan and Slocan City, 1,722,269 ounces; Skeena, 258,300; Boundary-Yale, 251,911; Ainsworth, 216,571; Fort Steele, 192,387; Coast, 128,648; Omineca, 104,838; Trail Creek, 51,508; all

other districts, 142,589. Total, 3,069,021 ounces. In the Slocan, which produced 56 per cent. out of the total silver output, the increase over 1916 was over 200,000 ounces and would have been larger but for the curtailed shipments of ore at different times owing to the inability of the Trail smelter to handle the ore. The largest producer was the Standard, with an output estimated at 374,000 ounces, followed by the Van-Roi, Queen Bess and Surprise, each over 200,000 ounces. The total number of shipping mines in that district was about thirty-five. Ainsworth and Fort Steele divisions showed decreases compared with the preceding year, while about 50 per cent. of the output of the Boundary district came from the Granby company's properties at Phoenix and the Skeena output was almost entirely from the Granby's Hidden Creek property at Anyox.

Lead showed a decrease of 10,065,705 lbs., but owing to increased prices the aggregate value of the output was \$46,821 over 1916, this 1917 output being the highest in the history of lead-mining in British Columbia. The high price in June was 11.181 cents a pound, declining to 6.25 cents in December. The average price for the year was 8.78 cents. By districts the output was: Slocan, 13,667,762 pounds; Fort Steele, 13,101,200; Ainsworth, 6,877,377; Nelson, 2,708,400; Windermere-Golden, 1,528,600; Revelstoke-Trout Lake-Lardeau, 410,700; Omineca, 287,672; all other districts, 80,100. Total, 38,661,811 pounds.

Copper production showed some falling off from the previous year, when the greatest output in the history of the Province occurred, but considering labor troubles, the year's results are deemed most satisfactory, the product being 6,416,617 pounds, valued at \$16,693,037, compared with the 1916 figures of 65,379,364, valued at \$17,784,494. But the 1917 output is the highest of any previous year but 1916. The average price of copper for the year was 27.18 cents compared with 27.202 cents in 1916. The district production was as follows: Skeena, 27,251,323 pounds; Southern Coast, 20,283,210; Boundary-Yale, 11,035,361; Trail Creek, 1,658,080; Omineca, 1,058,943; all other districts, 129,700. Total, 61,416,617 pounds.

During the past three years the report sets forth, copper mining has become the most important form of mining in British Columbia, and from all indications it should maintain this prominent place. Last year it formed 60 per cent. of the total value of the metalliferous mines and 45 per cent. of the total mineral production. In the working of the large low-grade deposits and subsequent smelting of the ores produced, a great number of men are employed and a large proportion of the money value is retained in the Province in payment of wages and purchase of supplies.

The gross production of coal was 2,402,410 long tons, of which 241,993 tons were made into coke, leaving a net production of 2,160,417 tons, a decrease from 1916 of 83,170 tons gross and an increase of 76,324 tons net. The quantity of coke produced was 159,554 tons, a decrease of 108,171 tons from 1916. The provincial coal production was divided as follows:

Vancouver Island	1,698,235
Nicola	151,817
Crow's Nest Pass	552,358

Coke production was: Vancouver Island, 30,399 tons; Nicola, nil; Crow's Nest Pass, 129,155. Total, 159,554 tons.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Published estimates of the total value of the mineral production of British Columbia for the calendar year 1917 range from \$37,500,000 to about \$41,300,000. The former amount is stated to be the latest estimate of the Provincial Mineralogist. The opinion of the Journal's correspondent, who, by the way, has not obtained any production figures from mine-owners other than those made public by the Trail smelter officials, is that it is just as likely as not the final returns will show even the lower estimate of the Provincial Mineralogist to have been somewhat high.

While these notes are being written before the date of the annual general meeting, in Toronto, of shareholders in the Consolidated Mining and Smelting Company of Canada, Limited, the results of the company's operations in its fiscal year ended September 30, last, are known, and it is gratifying to find that the total value (\$13,020,127) of the metals produced at the company's smelter at Trail was so much higher than in any previous year, and that a net profit of \$1,076,828 had been earned in the fiscal year, during which the total of dividends paid to shareholders (\$995,012) was also larger than in any previous year. It may be of interest to add that the total quantity of ore treated from the time the smelter was established in the early part of 1896 to September 30, 1916, was 5,626,324 tons, and that the quantities of metals produced and their total gross value were as follows: Gold, 1,877,235 oz.; silver, 29,290,981 oz.; lead, 498,309,934 lb.; copper 79,583,490 lb.; zinc, 23,058,996 lb.; gross value, \$102,207,303. The total of dividends paid during the same period is \$3,946,360.50, of which sum a little more than one-fourth was paid in the last fiscal year. It is recalled that Mr. S. G. Blaylock, the company's assistant general manager, when giving information concerning the Trail smelter and refineries in the course of an address made at the International Mining Convention held in Nelson, West Kootenay, B.C., last May, said: "The Trail plant is probably as complete a metallurgical institution as there is on the North American continent. Of course I do not say that it is by any means as large as some other plants, but we are working about sixteen hundred men, and are making electrolytic copper, copper sulphate, electrolytic lead, lead pipe, shrapnel, wire, electrolytic zinc, refined gold and silver, sulphuric acid, and hydrofluosilicic acid." The outstanding features of the last two years' operations are the successful establishment of an electrolytic copper refinery, the standardizing of the electrolytic zinc process and the completion of the electrolytic zinc refinery and latterly the increasing of output of refined spelter to more than sixty tons a day; also the establishment of the acid-making plants. Labor difficulties having been overcome, it is earnestly hoped that the current year's operations and results will be successful and satisfactory.

The following is a clipping from the Nelson Daily News of January 11: Nelson Board of Trade proposes to make a protest against the 10 per cent. income tax which has been imposed by the Provincial Government on mining companies of the province, it was intimated at the meeting last night. The details of the matter will be gone into later and the resolution presented to the Associated Boards of Trade convention in Nelson next month. Mr. Fred A. Starkey last night said the

tax would work a great hardship and recalled that last year Hon. William Sloan, Minister of Mines, had promised that there would be no increase of taxation of mines.

EAST KOOTENAY.

Work has been resumed at the Consolidated Mining and Smelting Co.'s Sullivan lead-zinc mine, which was closed in November when the Trail smelter employees went out on strike. During the first week of January there was received at Trail 1,188 tons of zinc ore from the Sullivan.

Approximate figures of the quantity of coal produced at Crow's Nest district collieries in 1917 show a total of about 559,000 long tons gross, that is including the coal made into coke. This quantity compares with 882,270 long tons gross for 1916. The decrease of fully one-third in output is, of course, the direct result in largest degree of the miners having been on strike for several months, and in a smaller extent of the occurrence of disasters at some of the mines of the Crow's Nest Pass Coal Co.

WEST KOOTENAY.

Ainsworth—Shipment of ore from mines in Ainsworth mining division has been small since the strike of the workers at the Trail smelter. The Bluebell shipped 342 tons in December, and during the first week in January 41 tons of zinc ore from the Bell mine, in Jackson basin, also reached the smelting works.

Much prominence has been given in newspaper columns to a proposal involving the purchase of the Sunset and Bell mines by the Utica Mines, Ltd., for \$70,000 cash and 800,000 shares in the company, which was approved at a meeting of shareholders held in Kaslo on January 5, which meeting also authorized an increase of the company's capital from 2,000,000 to 3,000,000 shares of \$1 each, par value. Meanwhile district newspapers report that mining has been suspended at the Utica mine, and that it is understood there is no money available at present for continuance of operations.

It is stated that thirty men are employed on the Consolidated Mining and Smelting Co.'s No. 1 silver-lead mine, in Ainsworth camp. There are other properties in the division on which work is being done, but generally there will be little ore production until such time as shipment to Trail shall again be permitted.

Slocan.—A meeting of shareholders of the Slocan Star Mines, Ltd., has been called to consider a proposal to wind up the affairs of the company, the accounts having shown a loss of \$38,700 as the result of operations during the fiscal year ended October 31. last. The company is reported to have ore valued at \$18,000, but the suspension of ore-buying at Trail has prevented realization.

The authorized capital of the Lucky Jim Zinc Mines, Ltd., is to be increased from \$2,500,000 to \$6,000,000. The purpose of the increase, it has been announced, is to absorb \$125,000 in bonds outstanding, discharge other obligations, and provide a surplus of treasury stock for sale to raise money for improving the mining property.

Following the report that a shoot of ore nine feet wide had been encountered on the 150-ft. level of the Galena Farm silver-lead-zinc mine, near Silverton, Slocan lake, it is stated that there is sufficient ore in sight to supply the concentrating mill with 100 tons daily for a period of six to eight months. Operation of the

concentrator will be resumed in March; meanwhile further development of the mine is in progress.

The ore shoot recently encountered on its property adjoining the Slocan Star mine has been developed by the Noonday Mines, Ltd., for 40 feet and its width found to be 8 ft. along that distance. About 12 in. of the ore is of shipping grade and the remainder suitable for concentrating. It is likely the latter will be concentrated at the Slocan Star mill, nearby.

Trail.—On January 4 the Trail News gave some information relative to conditions at the Consolidated Mining and Smelting Company's smelting works and refineries at Trail, in part as follows:

"Trail's extensive reduction works are once more getting back into their old form since the resumption of operations on December 21. Three or more furnaces are in operation, with others soon to be in blast; the zinc plant is practically in full swing, having turned out about 30 tons of spelter yesterday, and the copper refinery is being put into shape for again separating the gold and silver from the copper and producing the pure red metal. The concentrator and acid plants are also being operated.

"A little later the lead refinery will doubtless be again placed in commission, especially if some method can be worked out by the management for disposing of the lead product—a matter of no little importance not only to Trail, but as well to every silver-lead and lead-zinc mine in the Kootenay districts. The accumulation of pig lead that was on hand in November has practically all been shipped to market.

The total quantity of ore received at the Trail smelting works in 1917 was 347,614 tons, of which about 243,000 tons was from mines operated by the company and the remainder was of custom ores. The total for 1916 was 486,688 tons, so that there was in 1917 a decrease of 139,074 tons or 28 per cent., which was largely accounted for by there having been 187,000 tons less ore sent to Trail from the company's Rossland mines, with a partial offset of mines in East Kootenay.

VANCOUVER ISLAND.

The available supply of custom ore has proved too small to allow of the smelting works at Ladysmith to be continued in operation, so suspension has been found necessary. It is unlikely smelting will be resumed here until several months hence. Meanwhile efforts are being made to develop more ore and to arrange for its shipment to the smelter.

The gross output of coal from Vancouver Island collieries in 1917 is stated to have been 1,698,235 long tons, as compared with 1,492,761 tons for 1916. The proportions from the mines of the several companies are as follows: Canadian Collieries (Dunsmuir) Limited, 800,348 tons; Western Fuel Co., 658,001 tons; Pacific Coast Coal Mines, Ltd., 150,517 tons; B. C. Mining Co. (formerly Vancouver-Nanaimo Coal Mining Co.), 61,547 tons; Nanoose Collieries, 27,822 tons.

OMINECA.

The plan to haul ore from the Babine Bonanza Mining and Milling Co.'s property, in the Babine range, to the Grand Trunk Pacific railway at Telkwa, a distance of about sixteen miles, has been abandoned for the winter, the newly-made road being too soft to allow of heavy hauling being done over it. Mr. James Cronin, of Spokane, Washington, for many years manager of the St. Eugene lead mine in East Kootenay, but now at the head of the Babine Bonanza company, is re-

ported to have bonded what is known as the Sweeney properties, situated in the Sibola district, south of the G.T.P. railway. These claims are distant from the railway about fifty miles, but as there occurs on them some remarkable showings of silver-lead ore, development work will be done on them as soon as shall be practicable.

The Silver Standard Mining Company recently completed a contract it had entered into to ship ore from its mine on Glen Mountain, near Hazelton, to the Selby smelter, near San Francisco. It is understood that the ore thus shipped was silver-zinc ore. An idea of the metal contents of this kind of ore is given in an official report which states that in 1916 there was shipped from this mine to the United States, 209 tons of zinc-silver ore containing 168,616 lb. of zinc and 12,647 oz. of silver. The quantity of silver-lead ore shipped from the mine to the Trail smelter in 1917 was 366 tons as compared with 738 tons in 1916. Returns for 651 tons in 1916 gave gold 126 oz., silver 74,593 oz., and lead 162,051 lb. Arrangements have been made to put in a concentrating plant to treat the Standard ores and the machinery was recently at Prince Rupert on its way to Two-mile creek, where the mill buildings have been erected to receive it.

DAWSON MEN FIND COPPER.

Whitehorse, Yukon, Dec. 28.—A rich strike in copper ore has been made on Williams creek near Yukon Crossing, by Dawson men. A tunnel has been run into the hill 180 feet, and now the lead is being penetrated with splendid ore all the way. Joe Viau and Martin Berrigan, who are working on the ground this winter write the good news of the strike, and say they will have a good deal of the ore on the dump by spring. They write to Paul Guite and Dr. Lachapelle of this city, the heaviest owners in the property. Viau and Berrigan are working the property under special agreement.

Mr. Guite and Dr. Lachapelle have spent thousands of dollars on the development of the property, and deserve great credit for their persistence in opening the resources of the country. Mr. Guite has held interests there much longer than any others and has made the heaviest expenditures.

The strike is one of a group of ten copper claims lying on Williams and Merrit creek. The tunnel is on Williams creek, only three-quarters of a mile back from the steamboat landing on the main Yukon river, and four miles below Yukon Crossing.

Writing from Williams creek to Mr. Guite, Mr. Berrigan, in a letter just received, says:

"I am glad to tell you that the rock is showing up fine. We have two pieces here on the table to-night almost pure copper. Yes, she sure is looking good. Joe is just tickled to death. He is the happiest man you ever saw since the days of '98. Joe says that despite all the knockers we got a mine at last and you could not buy him out now for love or money.

"As we have to follow the hanging wall we cannot tell the width of the lead as it is all copper the whole width of the tunnel, so we can't tell how wide it is to the foot wall. But after we get the 100 feet we will crosscut to the foot wall to see how wide it really is. It is sure a big thing as it looks at present. You can see lots of solid chunks of the pure mineral coming out on every wheel barrow load. It is sure a big surprise to Joe, as you know when we struck the lead at first

as I was telling you in Dawson, there was no mineral in sight. It was not until we got in 10 feet on the lead that there appeared occasionally small signs of mineral. But she came in a rush at 20 feet. It was all copper, so I hope it will keep on getting better, as it has been since we hit the copper. I know Paul, you will feel good over this, as you told me you spent \$9,000 on this property. I think you are a lucky man. If you could see the face of this tunnel shining with copper you would think so too.

"We have lots of copper if we could convert it into money, but we can't do that just yet."

In another letter received by Dr. Lachapelle and written Nov. 11, Joe Viau writes:

"We got through the granite and now are in the lead, and have good indications of ore in the foot wall from which I enclose a couple of samples. Thank the Lord I am now on the down hill pull and I don't think you will have any more kick."—Weekly Star.

LAKE SUPERIOR DISTRICTS SHIPPED 64,275,000 TONS IRON ORE IN 1917.

The iron ore mined in the United States in 1917 amounted to about 75,324,000 gross tons, compared with 75,167,672 tons in 1916. The shipments from the mines in 1917 are estimated at 75,649,000 gross tons, valued at \$236,178,000, compared with 77,870,553 tons, valued at \$181,902,277 in 1916, a decrease in quantity of 2.9 per cent., but an increase in value of 29.8 per cent. The general average value of the ore per ton at the mines for the whole United States was therefore \$3.12 in 1917, as compared with \$2.34 in 1916.

About 85 per cent. of the ore mined in 1917 came, as usual, from the Lake Superior district, which mined about 63,964,000 gross tons and shipped 64,275,000 tons, these quantities representing a very slight increase and a decrease of 3.2 per cent., respectively, compared with 1916. The shipments of iron ore by water from the Lake Superior district, according to figures compiled by the Lake Superior Iron Ore Association, amounted in 1917 to 62,498,901 gross tons. It thus appears that the iron-mining industry in the Lake Superior district has been able to bear the strain of the war demand, but not to duplicate the great record of ore shipments made by Lake in 1916, which amounted to 64,734,198 gross tons. The slight falling off, it is understood, was due to less favorable weather for shipping early and late in the season of 1917 rather than to inability of the Lake fleet to handle the ore mined.

BOOK REVIEW.

Eye Hazards in Industrial Occupations (Octavo, 150 pp., illus.) By Gordon L. Berry, Field Secretary, National Committee for the Prevention of Blindness, with the co-operation of Lieut. Thomas P. Bradshaw, U. S. Army, formerly Technical Assistant to the Director of the American Museum of Safety. Published by the National Committee for the Prevention of Blindness, 130 East 22nd Street, New York. Price, 50 cents.

In this volume the author reviews the chief industrial hazards to eyesight in the industries of the United States. Case reports illustrate each section, the special dangers are described and recommendations made for such changes of working conditions, or installations of protective devices, as have been found suitable for protecting workers. The book is most completely illustrated.

DEVELOPMENT OF THE MURRAY-MOGRIDGE GOLD MINE.

Among the mining properties under active development in the Kirkland Lake gold area is the Murray-Mogridge, situated at Wolf Lake. Results of development at this property are very encouraging. Mr. G. S. Harkness has given us the following notes on operations to date:

The property, four hundred acres in extent, was acquired by the Murray-Mogridge company about a year ago. Last spring mining plant was installed and underground development commenced.

Two shafts have been sunk on Vein No. 1 about 2,600 ft. apart; the South or No. 2 to a depth of 240 ft., and the North or No. 1 to the 50 ft. level. Stations have been cut and the orebody opened up at the 50, 100 and 200 ft. levels from the No. 2 shaft, and within a short time the 300 ft. level will also be ready for lateral workings.

The vein system in all the workings ranges from 3 to 20 ft. in width, and average values from careful channel sampling on the different levels show the following results: Surface \$8; 50 ft. level \$12; 100 ft. level \$11 and 200 ft. level \$16.40 along the 175 ft. of drifting to date. Recent sampling near present faces shows the highest results yet obtained, values ranging from \$16 to \$60 across the full width of the drift with only one wall showing, while special samples from a rich streak along the foot wall gave high returns of \$600 to \$822 per ton.

The North or No. 1 shaft will also be continued to the 300 ft. level and after opening up the No. 1 vein at this point a crosscut will be run to the East to pick up No. 6 vein which was uncovered last fall. This vein stripped some 90 ft. and sampled every 3 ft. gave an average of \$13.20 across 5 ft. of ore. Four other veins carrying good commercial ore have been uncovered and trenched for a considerable distance. The property, conveniently located, is well equipped with all necessary buildings, machinery, etc.

OBITUARY

James May, the oldest prospector in Northern British Columbia, died recently at Hazelton. In a lengthy notice contributed to a Prince Rupert newspaper the following occurs: "James May was among the stamperers of the Fraser River excitement, and among the first in the greater stampede that followed to the Cariboo diggings. But as the outcome of these frolics he staked some claims on Tom Creek, in the Omineca, and despite the known propensity of old-time prospectors to drop everything on the rumor of a new strike, Jim stayed with these placer claims of his on Tom Creek—stayed with them for more than fifty years. A great gaunt figure was James May. His death removes a figure of the landscape in the Omineca diggings. Six feet two he was, broad and sinewy, wearing a closely trimmed beard these many years and always a smile and an open hand for every deserving creature, human or animal. Hard callous handed as he was, he was always the Kentucky gentleman."

The Pathfinder Consolidated Mining Company has been organized to acquire the Pathfinder and Little Bertha mining properties, in Grand Forks mining division of British Columbia. In earlier years the Pathfinder shipped copper ore, but the price of copper was then too low for operation of the mine to be profitable.

CARBON BRIQUETTES

Mr. W. J. Dick, of the Commission of Conservation, says:

To save from 45 cents to \$2.50 per ton is a possibility for the anthracite coal users of the prairie provinces. In 1916, Canada imported 4,570,000 tons of anthracite coal, nearly all of which was used for domestic purposes. Of this, about 400,000 tons were shipped to destinations in Manitoba and west thereof for domestic use. As the eastern portion of Saskatchewan forms the competitive area between supplies of United States coal on the one hand and the high grade bituminous coal of the Rocky Mountains on the other, the cost of coal in that portion of the province is high.

An investigation undertaken by the Commission of Conservation in co-operation with the Advisory Council for Scientific Research shows the economic possibility of manufacturing a high-grade fuel from the lignites of Saskatchewan. The results are published in the pamphlet "Carbonizing and Briquetting of Lignites." Carbonized lignite briquettes are stated to be practically equal in heating value to anthracite coal. They will, therefore, stand comparison very closely on the basis of cost. The difference in favor of briquettes as compared with anthracite coal varies from 45 cents per ton at Portage la Prairie to \$2.50 per ton at Moose Jaw. This allows a profit of \$1.00 per ton to the producing plant having a capacity of 30,000 tons per annum. With a capital cost of \$400,000, this would return 7½ per cent. on the investment. The lower price of carbonized briquettes would mean a large saving to consumers in western Manitoba and Saskatchewan and a plant such as that referred to would save some \$225,000 to the country annually which is now being paid to American coal producers.

FRENCH CONTROL OF METALS.

France is taking steps to ensure the economic development and control of her mineral and metal industries after the war. A company has been formed, entitled the **Societe Minerais et Metaux**, with a capital of \$2,000,000 for the purpose of fostering and protecting the metal industries of the country. The company, which is representative of existing interests, is not a profit-making enterprise so much as an organization which has for its object the improvement and extension of the methods of distribution, treatment, and marketing of the metals produced in France and her colonies.—W.J.D.

:: Markets ::

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 15 cents per lb.
 Jan. 25, 1918—Quotations from Canada Metal Co., Toronto).
 Spelter, 12 cents per lb.
 Lead, 9 cents per lb.
 Tin, 85 cents per lb.
 Antimony, 17 cents per lb.
 Copper, casting, 31 cents per lb.
 Electrolytic, 32 cents per lb.

Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Jan. 25, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$9.85 per ton.

Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York Cents	London Pence
Jan. 4, 1918	87%	43%
Jan. 4, 1918	89%	44%
Jan. 7, 1918	90%	45%
Jan. 8, 1918	90%	45%
Jan. 11, 1918	90%	45%
Jan. 14, 1918	90%	45%
Jan. 15, 1918	89%	44%
Jan. 17, 1918	89%	44%
Jan. 18, 1918	89%	44%
Jan. 21, 1918	88%	44%

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange on January 23, 1918.

Gold.		
	Bid	Ask
Apex .....	.04%	.05
Boston Creek .....	...	.24
Dome Extension .....	.09%	.10%
Dome Lake .....	.15	.15½
Dome Mines	8.50	...
Imperial .....	.01%	.02½
McIntyre	1.36	1.38
Hollinger	5.05	5.15
Newray .....	.38½	.38½
Porcupine Crown .....	.24	.25
Vipond .....	.17%	.19
Preston East Dome .....	.02½	.03
Teck-Hughes .....	.50	...
West Dome .....	.12½	.13

Silver.		
	Bid	Ask
Adanac .....	.10½	.11
Bailey .....	.04%	.04%
Beaver .....	.25½	.26
Ferland .....	.10½	...
Coniagas .....	...	...
Crown Reserve .....	.20	.24
Gifford .....	.03%	.04
Great Northern .....	.04	.04½
Hargraves .....	.08%	.09%
Hudson Bay .....	...	...
Kerr Lake	5.40	5.55
La Rose .....	.28	.32
McKinley .....	.54	.55
Nipissing	8.25	8.40
Peterson Lake .....	.10%	.11½
Right of Way .....	.03%	...
Seneca Superior .....	.01½	...
Silver Leaf .....	.01%	.01½
Temiskaming .....	.27	.27%
Tretheway .....	.15½	.15%
Wettlaufer .....	.04½	...
Mining Corporation	3.45	3.70
Provincial .....	.46½	.47½

NEW YORK MARKETS.

Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 6.75.

Lead, outside, nominal, 6.87½ to 7.12½.

Spelter, prompt western shipment, 7.82½ to 7.92½.

Antimony—

Chinese and Japanese nominal, 14.00 to 14.25.

Aluminum—nominal.

No. 1 Virgin 98-99 per cent., 36.00 to 38.00.

Pure 98-99 per cent. remelt, 34.00 to 36.00.

No. 12 alloy remelt, 27.00 to 29.00.

Powdered aluminum, 75.00 to 85.00.

Metallic Magnesium—99 per cent. plus \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Platinum (pure), \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic), \$3.25—3.50.

Tungsten—

Wolframite, \$24.00 to \$25.00.

Gravel Fluorspar: f.o.b. mines—

Prompt, \$28.00 to 32.00.

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We wish to draw the attention of mining, metallurgical, and development corporations to our excellent facilities for compiling, arranging, illustrating, printing and distributing Annual Statements, Special Reports, Descriptive Pamphlets, etc.

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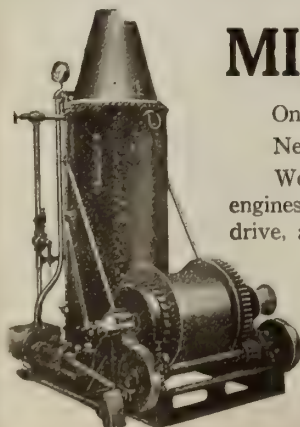
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OR

Canadian Mining Journal,

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Sheet copper—Base prices—

Hot rolled, \$31.50—33.00.

Cold rolled, 32.50—34.00.

Copper bottoms, 39.50—41.00.

(Shipments from stock 2c per lb. extra.)

Copper rods—Base prices—

Round, 32.50.

Sq. and rectangular, 33.50.

Copper wire—Base prices—

Nominal, 27.00.

Brass Products—Base prices—

High brass—

Sheets and wire, 27.50—29.50.

Rods, 24.75—26.75.

Low brass—

Sheets and wire, 30.00—32.00.

Rods, 30.75—32.75.

Brazed tubing—

Brass, 34.75—36.75.

Bronze, 39.75—41.75.

Seamless tubing—Base prices—

Brass, 35.50—37.50.

Copper, 38.00—40.00.

Bronze, 42.50—43.50.

Full lead sheets, 9.25.

Cut lead sheets, 9.50.

Sheet zinc, f.o.b. smelter, 19.00.

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3—75 h.p., 550 v., various speeds.

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1—40 h.p., 550 v., 1000 rpm.

1—30 h.p., 220 v., 1200 rpm.

2—15 h.p., 220 v., 900 rpm.

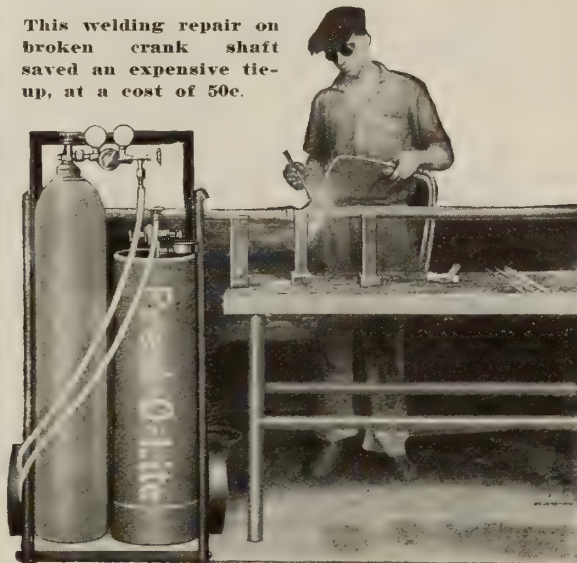
2—10 h.p., 220 v., 900 rpm.

2—5 h.p., 220 v., 1200 rpm.

Lots of others, too numerous to show; write for list.

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For list of publications, illustrated reports, geological maps and mining laws, apply to

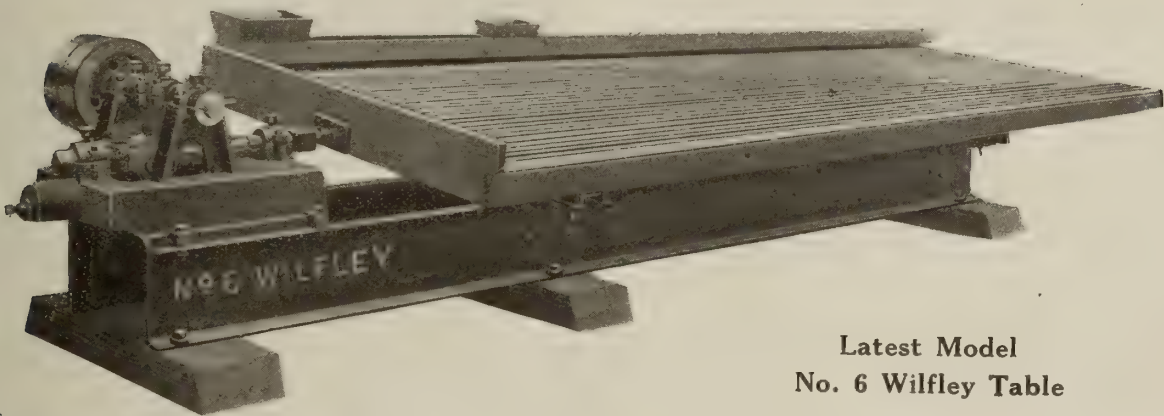
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Minister of Lands, Forests and Mines,

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MINES BRANCH

Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wildon, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of the Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

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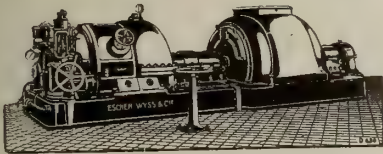
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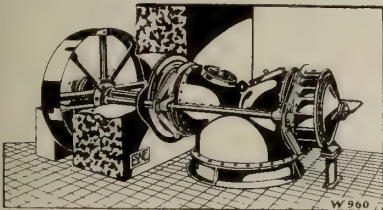
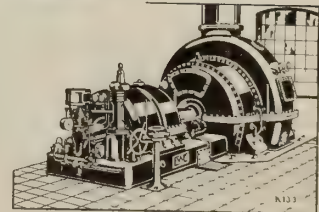
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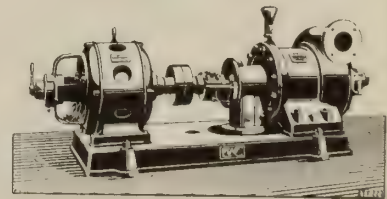
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Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
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- Pig Tin—**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead—**
Canada Metal Co., Ltd.
Hoyt Metal Co.

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Pipes— Can. Fairbanks-Morse Co. Canada Metal Co., Ltd. Consolidated M. & S. Co. Pacific Coast Pipe Co., Ltd. Northern Canada Supply Co. Smart-Turner Machine Co.	Pumps—Electric— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	Steel—High Speed— Can. B. K. Morton	Steel—Tool— N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
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Piston Rock Drills— Mussens, Limited. Can. Allis-Chalmers, Ltd.	Pumps—Steam— Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	Scales— Can. Fairbanks-Morse Co.	Switchboards— Can. Gen. Electric Co., Ltd.
Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco. Jenckes Machine Co.	Pumps—Turbine— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. ada, Limited. Can. Allis-Chalmers, Ltd.	Screens— Jeffrey Mfg. Co. Northern Canada Supply Co. Hendrick Mfg. Co.	Tanks—Steel— Marsh & Henthorn, Ltd.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd.	Pumps—Vacuum— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	Screens—Cross Patent Flanged Lip— Hendrick Mfg. Co.	Tanks—Cyanide, Etc.— Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd.
Pulleys, Shafting and Hangings— Can. Fairbanks-Morse Co. Jeffrey Mfg. Co. Northern Canada Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	Separators— Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	Transits— C. L. Berger & Sons.
Pumps—Boiler Feed— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Roofing— Can. Fairbanks-Morse Co. Northern Canada Supply Co.	Sheet Lead— Canada Metal Co., Ltd.	Transformers— Can. Gen. Electric Co., Ltd.
Pumps—Centrifugal— Can. Fairbanks-Morse Co. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Turbines— Escher Wyss & Co. Can. Allis-Chalmers, Ltd.
	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	Shovels—Steam— M. Beatty & Sons.	Twist Drills—High Speed— Can. B. K. Morton Co.
		Smoke Stacks— Can. Allis-Chalmers, Ltd. Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd. Marsh & Henthorn, Ltd.	Valves— Can. Fairbanks-Morse Co.
		Steel Barrels— Smart-Turner Machine Co.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd. Marsh & Henthorn, Ltd.
		Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		Steel Drums— Smart-Turner Machine Co.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
			Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.

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February 15, 1918

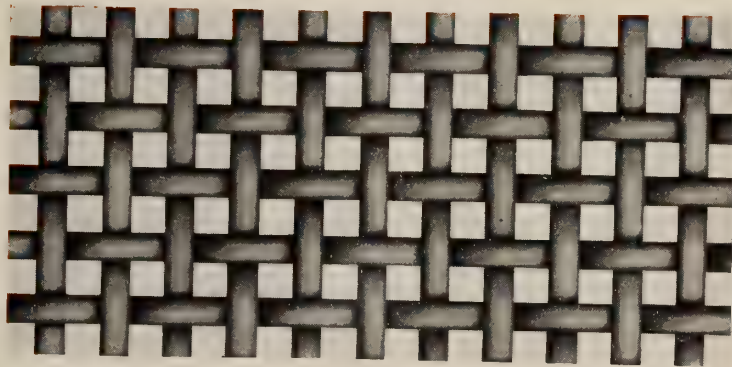
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VOL. XXXIX

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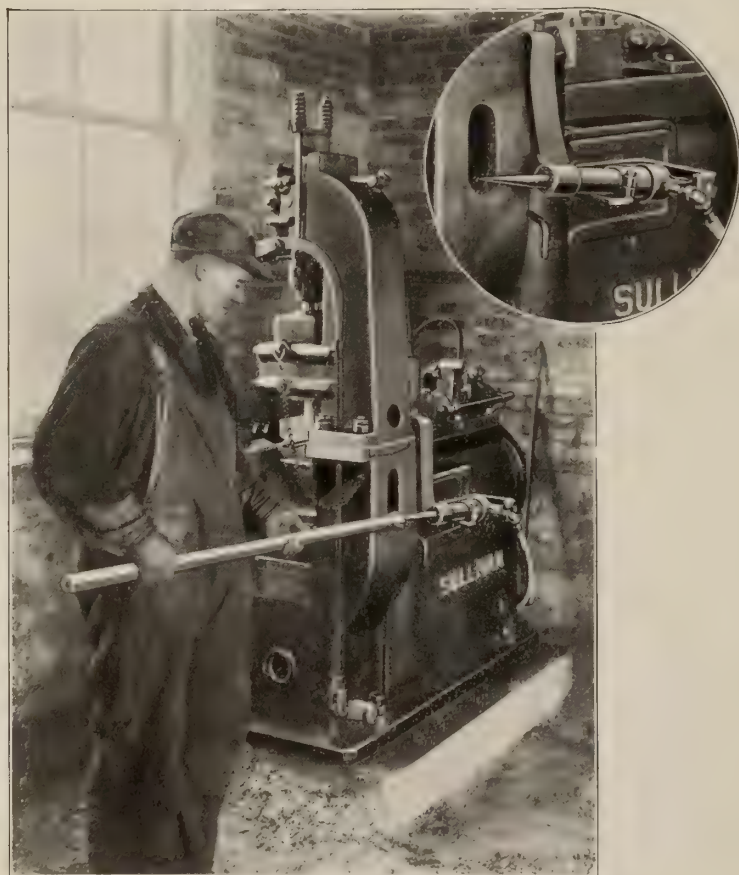
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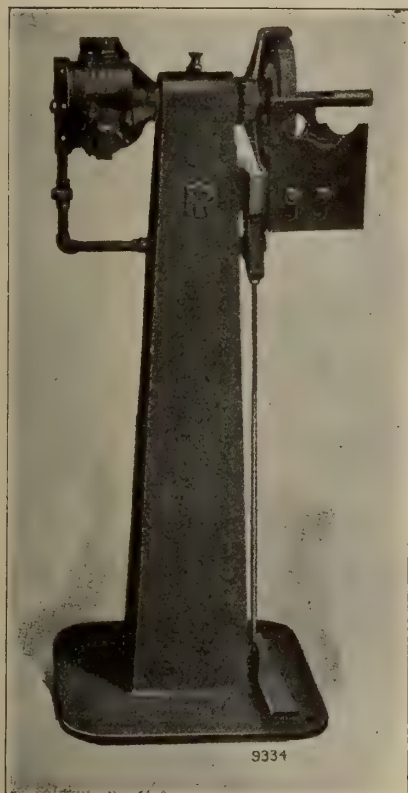
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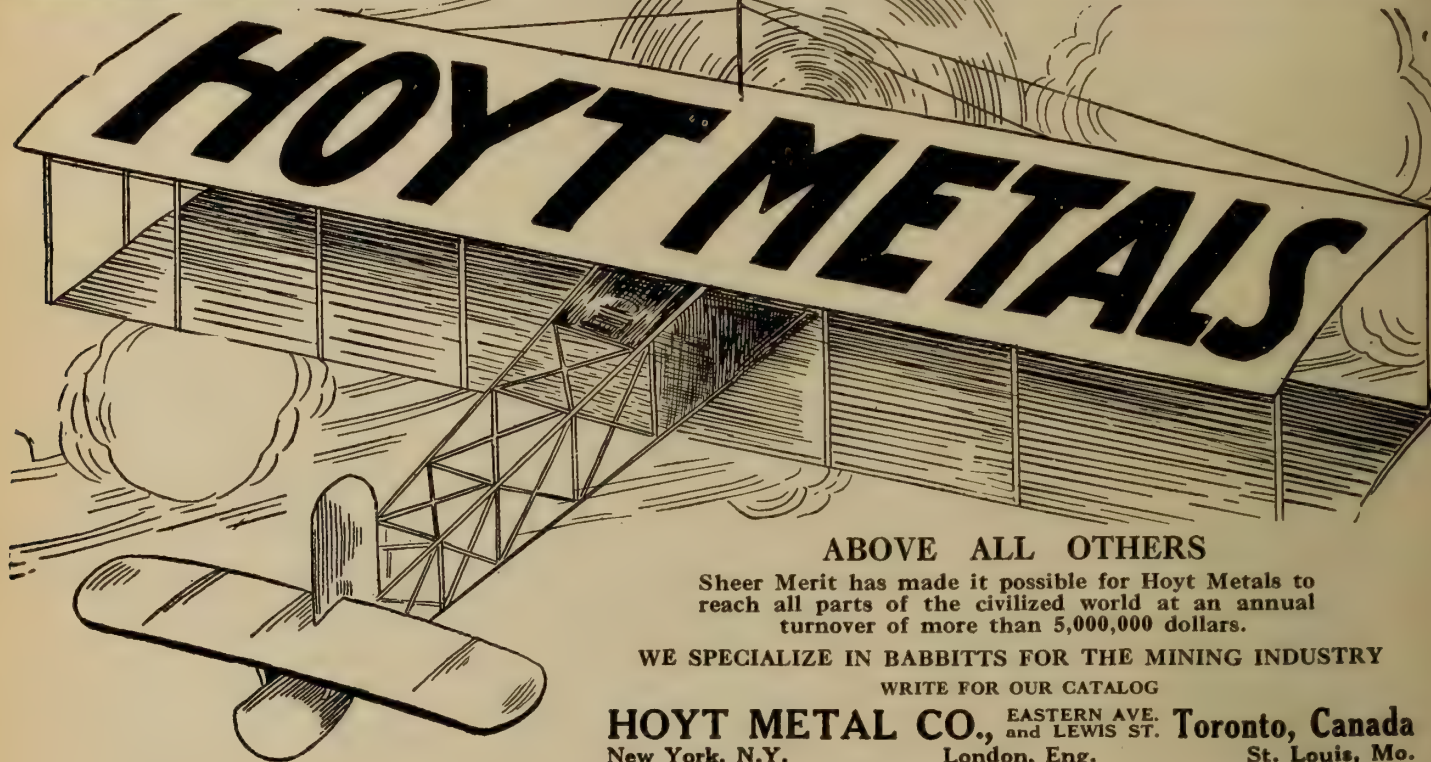
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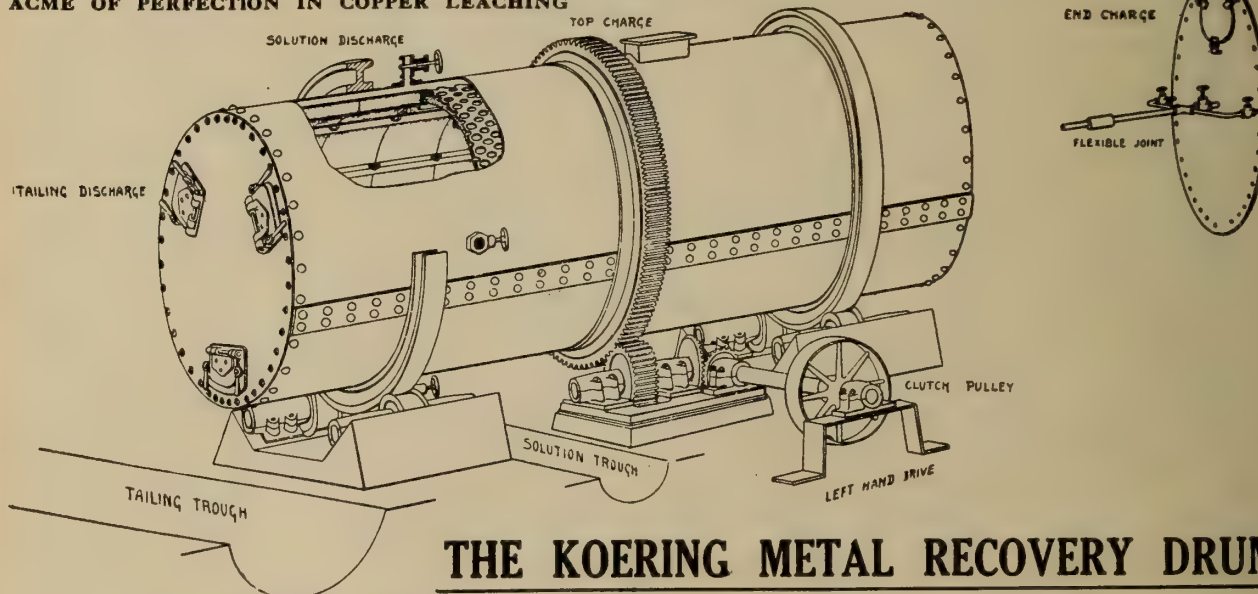
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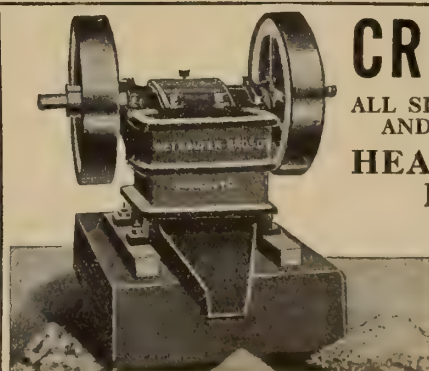
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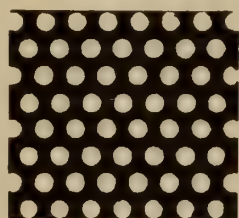
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The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

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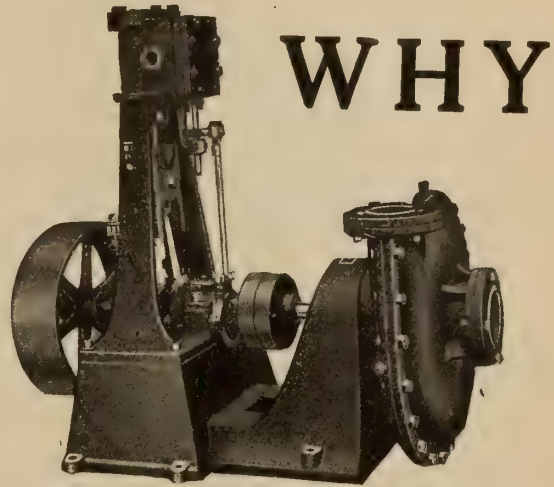
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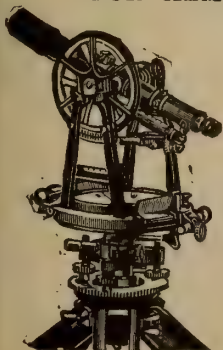
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THE CANADIAN MINING JOURNAL

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The annual meeting of the Canadian Mining Institute will this year be held in Montreal on March 6th, 7th and 8th. Many important matters will be discussed and it is to be hoped that members will make every effort to be present. Canadians cannot afford to neglect such an opportunity to get together and talk things over. The mining men of the country have a duty to perform and they realize it more fully when they hear and take part in discussions on what is being done towards increasing production of minerals for war purposes and for maintaining Canada's credit now and after the war. If you attend this meeting and take an interest in the discussions you will doubtless make useful criticisms and suggestions. Don't be misled by the supposition that these meetings are unnecessary or undesirable in wartime, because they happen to be enjoyable functions. They are more useful now than they ever were, and you owe it to yourself and your country to attend.

During the past seven years Canada has had eight so-called Ministers of Mines. It is a pleasure therefore to record that there are signs that we now have a real one. We have, unfortunately, to be satisfied for the present with only half the attention of the new minister, for he also holds the portfolio of Secretary of State. Half the time of a capable minister will, however, be more than we have had for some years.

Hon. Martin Burrell, Minister of Mines and Secretary of State, has reason to be proud of his record as Minister of Agriculture. He has a good opportunity for showing again his ability as an organizer. His predecessors gave little attention to the business of the Mines Department and the Cabinet utterly failed in its duty to the mining industry. We expect that the new Cabinet and particularly the new Minister of Mines will make some effort to inform themselves as to the best means for speeding up the development of our mineral resources. Mr. Burrell will not have to do very much to surpass the efforts of those who preceded him. We do not believe that he will be content to be classed with them. He is not unfamiliar with the mining industry and as head of the Department of Agriculture he made a reputation that leads us to hope for much.

The fuel shortage has naturally directed much attention to fuels other than coal. Plans are being made to utilize peat, and an unusually large amount of wood is being burned. It would be well, however, for the public to realize that North America has plenty of good coal for immediate needs and that the real problem is one of transportation. There is, of course, a shortage of labor, but the great cause of shortage at points of consumption is inability of the railway companies to take the coal quickly from the mines to the consumers. We should cut out the long hauls where they are not necessary. Canadian coal in east and west should be more fully utilized in both Canada and the United States. Americans who think that central Canada gets too much coal from the United States, will do well to consider who is responsible for the failure to more largely use Canadian coal in northern Atlantic and Pacific States. In Nova Scotia we have great coal mines right on the sea, admirably situated to supply Boston and nearby ports. We have similar conditions on the Pacific coast. In Ontario we have no coal; but are close to great United States coal fields. By more complete utilization of our Niagara and St. Lawrence water powers Ontario should be able to get along without much coal for power purposes; but will be glad to have American coal for heating purposes.

We would suggest that the Fuel Controllers of the United States and Canada could help relieve the coal shortage by doing what they can towards increasing reciprocity in the use of coal and, if necessary, in the supply of labor and transportation facilities. They will do well to enquire into the conditions which have prevented the proper utilization of Canadian coal in Manitoba and North Western States. They will do well to consider whether Nova Scotia coal could not be more extensively used in New England and on the Atlantic.

Oil Prospecting in Southwestern Ontario*

By M. Y. Williams.

To-day it is self evident that Canada needs petroleum. America needs petroleum, the world needs petroleum, alike for war-time and the more peaceful endeavors. This need is manifest in the rising cost of all petroleum products, and the result has been a great impetus to oil prospecting. At the present time, America is drawing on its stored surplus of petroleum and petroleum products.

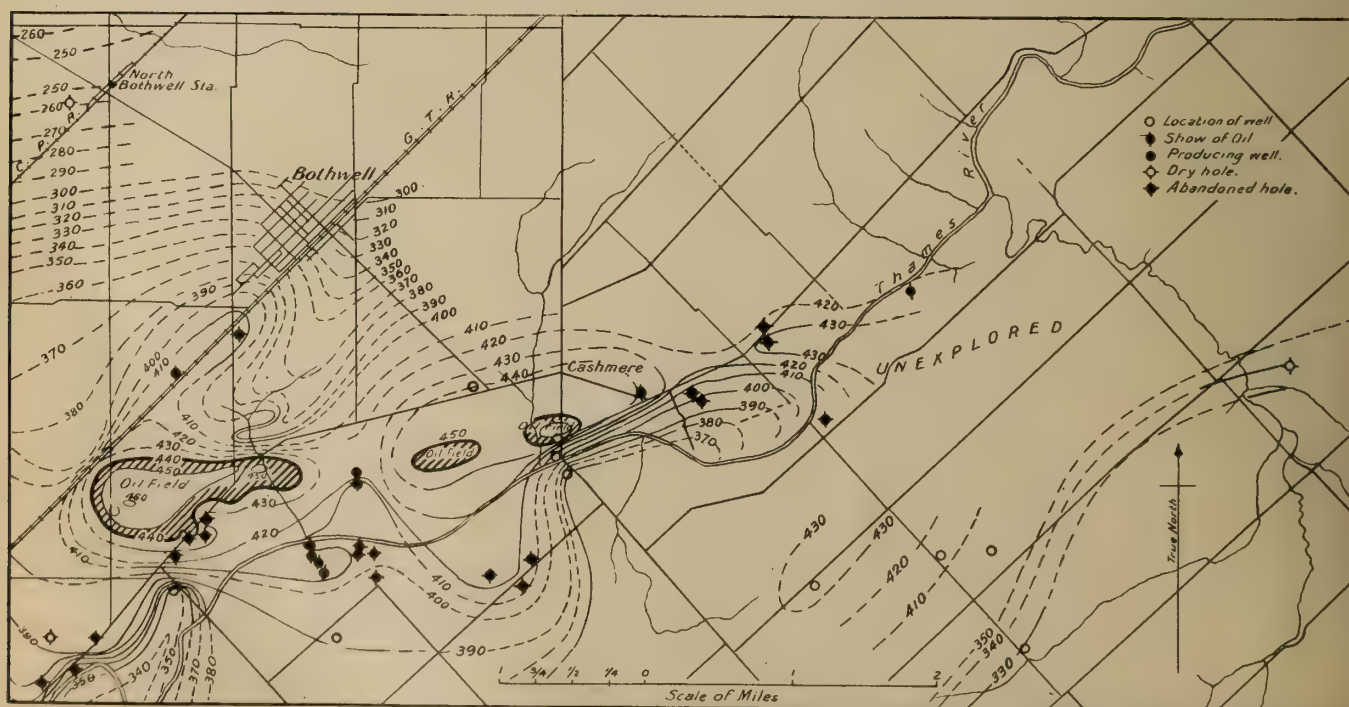
Let us examine the conditions of our Canadian supply. In 1916† Canada paid bounty on 198,123 barrels of crude petroleum valued at \$392,284 which may be taken as the total production exclusive of the small amount of light oil produced in Alberta, which is too low in specific gravity to draw Government bounty. Of the oil upon which bounty was paid, New Brunswick produced 1,345 barrels, and Ontario 196,778 barrels. The value of the total exports of petroleum and its products amounted in 1916 to \$73,771, and of the total imports to \$14,701,521. From the above the urgent need of an increase in our petroleum production is clear, and renewed prospecting is a reflection of the need.

What are the results in Ontario to date? Taken altogether, it is too soon to predict what the real results of the present efforts at increased oil production will be, as these will doubtless be cumulative and spread over several years to come. However, an abandoned prospect north of Glencoe, in Mosa township, Middlesex county, has been turned into a producing oil field by the Ontario Petroleum Company under the careful scientific management of F. J. Carman, of Bothwell. The oil produced here is from the Onondaga (Corniferous) limestone. In Dover West township, Kent county, a well drilled in to the Trenton limestone by the Union Natural Gas Company is changing from a gas well to an oil well, and is producing considerable

quantities of petroleum. Other areas are being tested by the drill and the results will be learned in due time.

Besides the Onondaga (Corniferous) limestone which is the principal formation producing petroleum, the lower Salina and upper Guelph dolomites are producing oil in southwestern Kent, and the eastern part of Essex county. Near Brantford some oil is produced from the Queenston shale just below the Medina (Whirlpool) sandstone. The deepest petroliferous formation is the Trenton limestone which is known to contain some oil on Manitoulin Island, at Milton, and in West Dover township, Kent county. This formation, which is now being tested near Rockwood in Dover township, at Flesherton, at Rondeau and elsewhere, has produced great quantities of oil in Ohio, and is looked upon by Ontario prospectors as a possible source of supply.

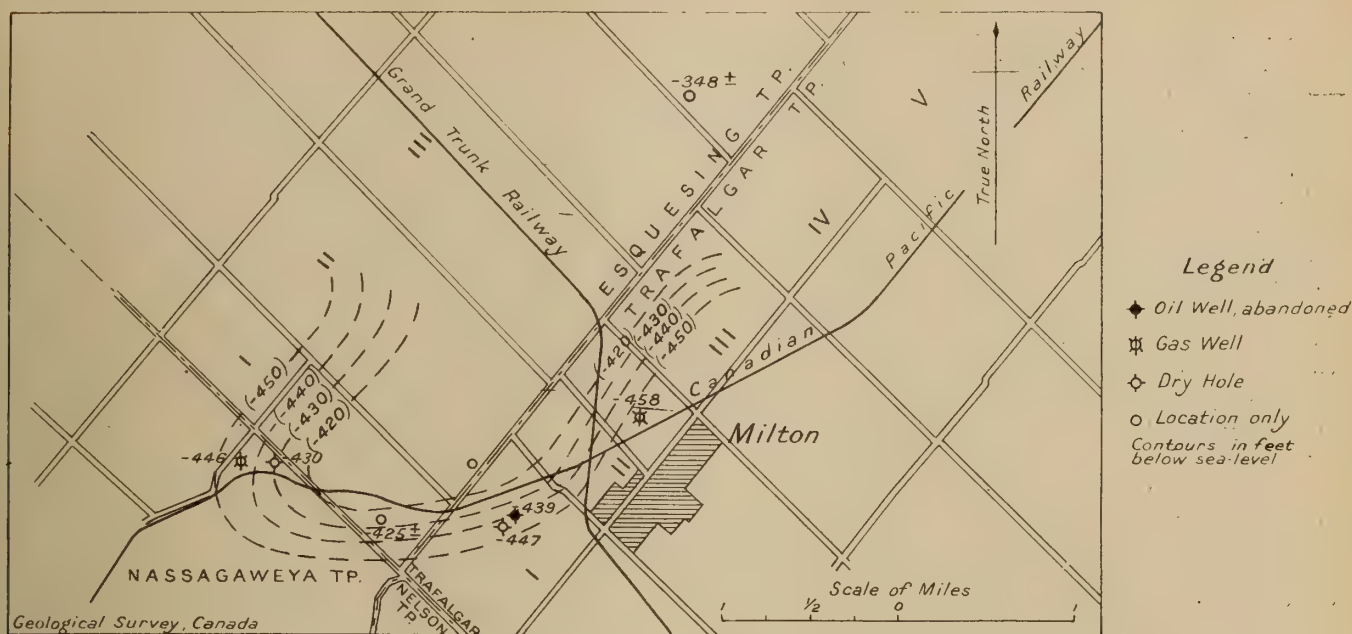
Times have changed in the petroleum industry from the 'sixties, when stream beds were considered the most likely places to prospect for oil, (the natural excavation certainly saved much digging in the old fashioned clumsy way), and again from the 'nineties when plenty of water and good board were primary requisites for location with the explorers of the average company. To-day, thanks to pioneering work done by I. C. White in Pennsylvania which was followed later in the Canadian field by E. Coste, F. J. Carman and others, the localization of oil in "inverted" basins of rock, which take the form of domes, anticlines or monoclines, is well established in the average case, in which the strata bearing oil are also water-bearing and are of fairly uniform porosity. This is because oil floats on water and hence is forced to the top of the basin. In cases where the oil-bearing strata do not contain water, the oil tends to gravitate toward the synclines and basins, but as a strong driving force is lacking,



Structure Diagram of the Top of "Corniferous" Delaware limestone, showing the Bothwell Oil Domes. Structure contours are broken where information is insufficient. Contour intervals 10 feet, elevations are above sea level.

*By permission of the Geological Survey, Ottawa. Further information may be looked for in the 1917 Summary Report of the Geological Survey.

†Preliminary Report, Mineral Production of Canada, Mines Branch, Department of Mines, pp.20-21.



Structure Diagram of the Top of the Trenton Formation near Milton, Ont. The broken lines are approximate contours of lines passing through points of equal elevation at the top of the Trenton Formation.
 ↓ Contour intervals 10 feet; elevations are below sea level.

the accumulation is apt to be less pronounced than in the case of the normal accumulation in domes and anticlines.

Keeping these facts in mind, the well advised prospector collects all available data as to the elevation at different points of the formation to be prospected, and then chooses the highest point for his wells. Rarely does the first well prove or disprove the field. Well must follow well, the location in each case being made in the direction of higher structure suggested by previous wells, unless no water is found, in which case low structure is to be sought. The importance of keeping samples and accurate logs of wells in such work is evident. Except in very level country the elevations of the tops of wells should be determined, as only by knowing the surface elevations, can well logs be accurately compared and structure worked out.

In the light of recent oil discoveries in southwestern Ontario and in view of the fact that considerable areas of promising country have been lost sight of by being placed in the category of country already drilled, it seems probable that new oil pools will still be found in the Onondaga (Corniferous) limestone of southwestern Ontario. The Guelph formation is only partially explored, and it is possible that, by making use of the present knowledge of the structure of the Onondaga, new pools may be found in the Guelph beneath Onondaga (Corniferous) domes. Hopes are entertained that the Trenton formation, in spite of its apparent lack of water and varying porosity, may still be successfully developed.

Suggestions to Prospectors.

The attention of the prospector for oil is called to the following considerations. In the Milton area the highest structure probably lies about three-quarters of a mile north of the well in the Brandon brick yard which has produced some oil. The accompanying diagram showing the structure of the top of the Trenton formation as determined from the logs of some of the

wells already drilled, suggests that this is the case. The absence of salt water in the Trenton near Milton, however, would suggest drilling on lower structure, that is, away from the centre of the dome. Wells drilled to the south of the "oil well," however, struck no oil and although both producing gas wells are on lower structure the gas and oil of this region occur at different levels in the Trenton. It is probable that the rock porosity is variable, and hence the occurrence of oil is likely to be "pockety."

Other favorable locations for prospecting the Trenton formation are on the middle and southern parts of Manitoulin Island, away from Manitowaning bay and the north channel with its other tributary bays, which wash the Trenton outcrops and have thus allowed natural egress for oil and gas, and ingress for water. Excepting one dry well drilled by H. F. Slater 100 ft. into the Trenton at Providence bay, no drilling has been done south of Lakes Manitou, Mindemoya and Kagawong, and Bayfield sound. At Providence bay, the Trenton was struck at 900 ft. in depth. It is well known that considerable quantities of oil were found in the Trenton in wells drilled near Wekwemikong, Manitowaning and Gore Bay. At Manitowaning the Top of the Trenton was penetrated at a depth of about 440 ft.

The Bruce peninsula, north of Wiarton, also offers virgin ground for prospecting the Trenton. Numerous undulations in the rock structure are visible along the 20-mile coast line between Cabot Head and Cape Hurd, and down the eastern coast. Much of this region, however, is difficult of access and prospecting here can well await the results obtained in the Trenton elsewhere.

As indicated on the accompanying diagram, the structure in the Bothwell field suggests a favorable area for prospecting from one and one half to four miles east of Cashmere. The wells drilled to the north, south and east are not on line with the Bothwell domes and there is room for another dome in this unexplored area.

Exploration of Nickel-Copper Properties in Falconbridge Township, Sudbury District, Ontario*

By Hugh M. Roberts and Robert Davis Longyear.

During 1916 and 1917, the E. J. Longyear Co. of Minneapolis, Minn., carried out a campaign of exploration for nickel-copper ore in the Sudbury District of Ontario. The work was initiated by W. E. Smith, a resident of Sudbury, who called the attention of W. J. Mead, Chief Geologist of the E. J. Longyear Co., to the fact that explorable lands in the Sudbury District were still available. Five diamond drills were employed, and holes were drilled in the townships of Levaack, Trill, Denison, Blezard, Garson, Falconbridge and MacLennan.

As a result of this exploration, a large body of nickel and copper ore has been found in the western part of the Township of Falconbridge. This property lies in the eastern part of the Sudbury District, east of the Garson mine.

The geological direction of this work necessarily included a careful consideration of the nature and mode of occurrence of the Sudbury ore deposits and of the various existing ideas as to their manner of origin. Since exploratory work is very practical research in the theory of ore deposition, the writers propose in this paper to present the results of this investigation, and in particular to trace the influence of current theories of origin of the ores upon the conduct of the exploration.

The field geology is discussed by H. M. Roberts; the petrography and detailed study of the ore is the work of R. D. Longyear. We are indebted to C. K. Leith, W. J. Mead, W. H. Emmons and E. C. Harder for suggestions and criticisms.

The various places where drilling was to be undertaken were selected on the basis of A. P. Coleman's map and report. This was essentially the latest expression of the thought of Canadian geologists on the Sudbury District, embodying not only Coleman's own more recent work but the previous work of Barlow, Walker and others of the Canadian Geological Survey and the Ontario Bureau of Mines. Attention was given also to the work by Dickson, Knight and others, concerning the origin of the ore, whose views differed somewhat from those of earlier investigators.

It will not be necessary to enter upon a protracted description of the general geology of the district, as this has been discussed at length in recent geologic literature, but it may be well to outline a few important field relations.

Coleman's map shows a nickel-bearing intrusive, probably of Keweenawan age, which came in as a "laccolithic sheet" or sill. We wish to state our belief in the essential accuracy of this map. The laccolithic sheet is a body some 10,000 ft. thick and was intruded along an unconformable plane of contact between an older complex of Archean-Huronian rocks, and the younger flat-lying sediments mapped by Coleman as upper Huronian but described later by Collins as Animikie.

During the intrusion and cooling of this mass, the flat-lying sediments of the Animikie were displaced, and deformation of all the rocks in the area took place. The crust of rock covering the internal reservoirs, from which the intrusion came, ultimately settled, so that

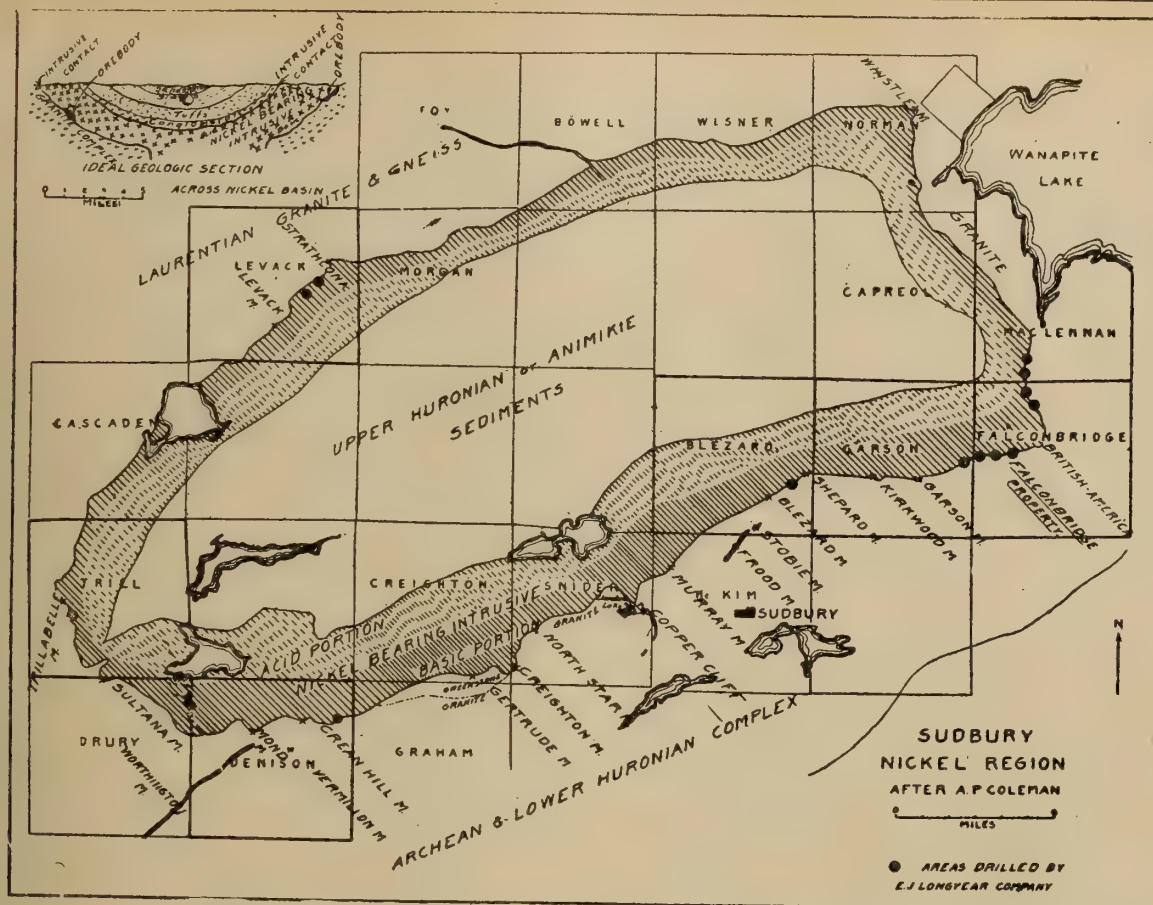
at present the central portion of the district is folded into a synclinal basin some 40 miles long and 15 miles wide. A great thickness of Animikie sediments has been removed, and also much of the nickel-bearing intrusive itself, bringing the lower portions to view at surface. The distribution of the intrusive is oval-shaped, and its outer edge constitutes the outer rim of the basin. The sediments in the interior of the basin have been faulted and continuations of these faulted zones, exterior to the basin, are represented by bodies of norite which were intruded into zones of weakness. These masses constitute forms described by Coleman as "offsets." Typical instances are found at Worthington and Copper Cliff.

Since the time when the magma was hardened into rock, many geologic periods have elapsed. During this interval, the region has been planed down by erosion. In much of the area, all of the rocks are stripped down to the older complex which is itself eroded. The region has since been glaciated.

The nickel-bearing intrusive is composed of two kinds of rock which grade into each other, micropegmatite, a phase of granite in the upper portion, and norite, a species of gabbro, toward the bottom. This gradation has been called in question—notably by Harker. At the very bottom of the intrusive, at its contact with the lower complex as now exposed by erosion, the norite and adjoining rocks contain the iron sulphide, pyrrhotite, with which is associated the nickel-bearing sulphide, pentlandite, and the copper-bearing sulphide, chalcopyrite. Commercial orebodies are found in places where the sulphides form a preponderant part of the rock. Orebodies of this type are described by Coleman as "marginal" deposits. The "offsets," previously mentioned, also carry important orebodies.

We believe, after examining many widely scattered cross-sections, that the intrusive sill is essentially one geologic body, differing in its mineral content from place to place. There are, however, later intrusions of diabase. An intrusion of granite also occurs within the norite near the Murray mine. Toward the interior of the basin, i.e., away from the lower contact of the intrusive, the norite changes its mineralogical characteristics and approaches granite in composition. This is true wherever the rock has been traced away from the contact in the Townships of Levaack, Howell and Wisner on the north, Trill on the west, and Garson and MacLennan on the east. The more acid rock which is found is similar in grain, and can always be recognized as a part of the same mass as the basic norite at the edge. In large outcrops of the intrusive, the effect of segregative tendencies in the molten mass may be witnessed; areas, 20 ft. square, or more, may be seen to be dominantly composed of pyroxenes. At a distance of 100 ft., segregations of rock comprised more largely of plagioclase and orthoclase feldspars may be seen. These occurrences are physically continuous and have a continuity of textures and grain. During the course of a single drill hole, for instance, one deep hole drilled in the Township of Levaack on the north side of the basin, the gradation in the mineralogical composition from basic to acid may be clearly recognized. These facts lead to the conclusion that the intrusive body is essentially one mass, solidifying from a molten magma as a unit. The constant and widely distributed relation between the basic and acid portions of this body leads to the same conclusion.

*Extracts from a paper to be presented at the New York meeting of the A.I.M.E.



Sudbury nickel region, showing areas drilled by E. J. Longyear Company.

We agree with Coleman that this mass is a sill, or laccolithic sheet, rather than a dike-like intrusion, for the reason that an inward dip from the contact toward the center has been found at every place where we have drilled—in Levack 45 deg., in Trill 30 deg., in Denison 45 deg., in Falconbridge 70 deg. to 90 deg., coinciding in this respect with the evidence at most of the mines. The instances of steep and southward dips of the contact on the south limb in Falconbridge Township and at Garson and Crean Hill mines might be accounted for, on the basis that the structurally weak sediments and greenstones of those localities yielded under the weight of the intrusive and rolled up before the advancing mass, whereas the more resistant granite, as at Creighton mine, withstood the thrust; hence the relatively flat dips wherever the footwall is composed of massive granite.

The Orebody in Western Falconbridge Township.

The orebody, here described, is located in Lots 10, 11 and 12 of the Fourth Concession of the Township of Falconbridge. It lies at the eastern end of the southern limb of the synclinal basin, occurring at the outer margin of the norite. The Garson mine of the Mond Nickel Co., $2\frac{1}{2}$ miles to the southwest, is the nearest productive orebody. East of the property, in Lot 8, Con. IV, is a prospect owned by the British-American Nickel Co., where a small tonnage of medium-grade ore has been developed.

The main orebody has a length of 7,500 ft. The exploration was done mainly by diamond drilling. A small exploration shaft was sunk in ore for the purpose of checking the results of the drilling.

A mantle of glacial drift, from 50 to 250 ft. thick covers most of the rock formation. Few rock outcrops occur near the norite contact. In the main, the drift has formed extensive sand plains broken in places

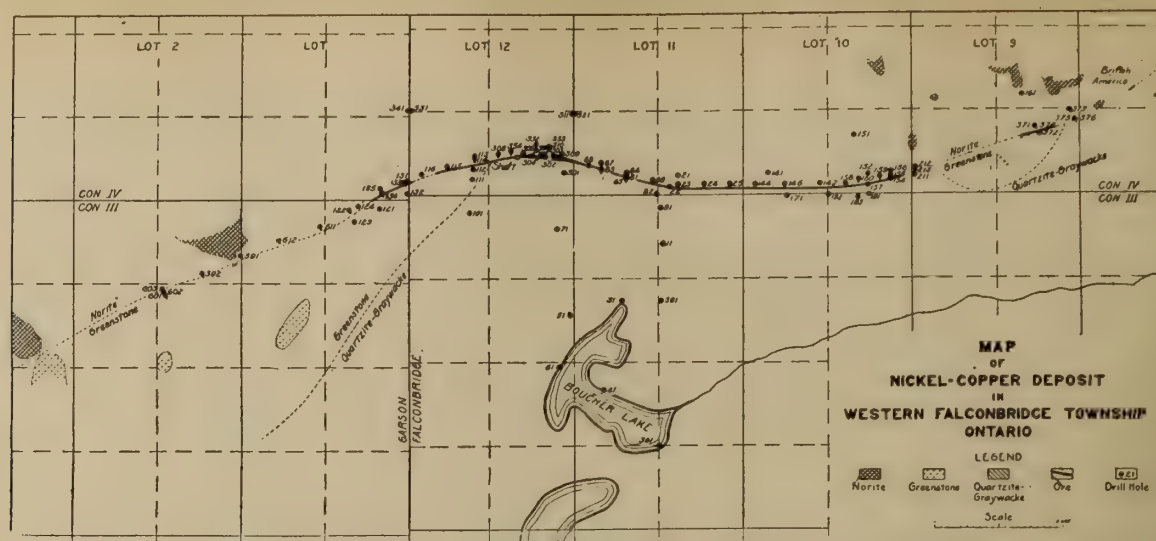
by kettles, locally known as pot holes. Cutting diagonally across the western part of the property in a north-easterly and southwesterly direction is a peculiar series of kettles, hills and ridges, which extend north-eastward to Wanapitei Lake.

The general inclination of the bed-rock surface is southeastward toward an old pre-glacial valley now indicated by swamp land, and small lakes. As shown by drilling, there is a rock escarpment along the north-west shore of Boucher Lake over which the glacial material has spilled, forming a steep bank.

The orebody occurs at the contact of the norite and footwall in a continuous band extending from the southwest corner of Lot 12, Con. IV, to the southeast corner of Lot 10, Con. IV, in the Township of Falconbridge. This is a total length of 7,500 ft., which is longer than any other known orebody in the district. This length has not been completely explored throughout, but it is a reasonable assumption that the ore is continuous over

Beyond the ends of this orebody are smaller outlying deposits, making the total length of the mineralized zone some 11,200 ft. The thickness varies from a minimum of 10 ft. to a maximum of about 120 ft. The greatest depth at which the orebody has been cut by a drill hole is 1,020 ft. below the surface of the ground. It probably extends to a much greater depth.

This orebody is a typical example of the so-called marginal deposit of the Sudbury district. In general, the ore is at the contact of the norite hanging-wall and the underlying quartzite or greenstone. In some cases, however, the ore is several feet away from the contact, and within the quartzite or greenstone. The ore generally dips steeply to the north. In two places, overhanging dips to the south have been observed. In some places the walls have a very irregular shape.



Map of nickel-copper deposit in Falconbridge Township, Sudbury District, Ontario.

The ores can be classified in three types: (1) norite partly impregnated with sulphides, (2) footwall (usually quartzite on this property) partly impregnated with sulphides, and (3) massive sulphides containing small particles of rock. The last type grades into the other two.

The sulphides in the norite usually take the form of blebs scattered uniformly throughout the rock. The sulphides in the footwall rocks may be blebs, but are more often in the form of irregular veinlets. Often the rock associated with the ore is so schistose that its original nature is uncertain.

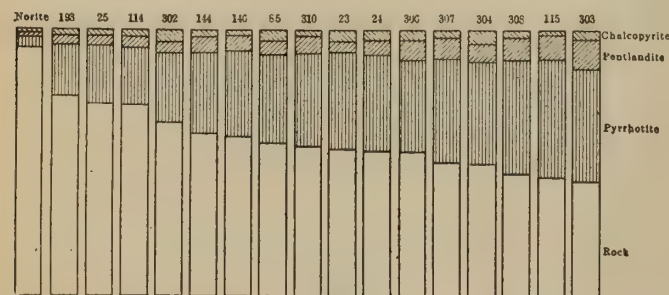
In the massive ore, it is rare to find less than 5 to 10 per cent. of rock particles present. These particles may consist of quartz, norite, quartzite, greenstone, or an indeterminate schist. They may be rounded, sub-angular, or angular, and generally suggest replacement by the sulphides.

The sulphide minerals comprising the ore are, in order of abundance, pyrrhotite (Fe_7S_{12}), pentlandite (FeNiS_2), and chalcopyrite (CuFeS).

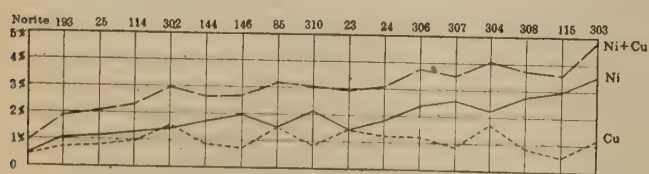
The proportions of minerals present are shown graphically in the accompanying figure. The first column represents the composition of a sample of typical mineralized or "spotted" norite. Each of the other

columns represents a composite sample of all ore in a drill hole between the foot and hanging walls. The relative amount of minerals present was calculated from analyses. It was assumed that all of the nickel occurs in the form of pentlandite. Cobalt, and arsenic were neglected as being too insignificant in amount to affect the results.

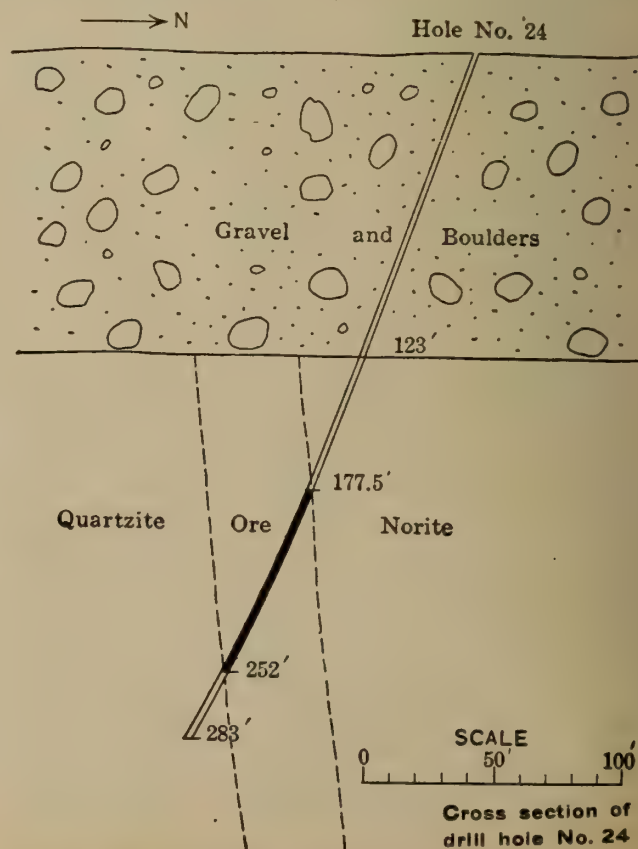
It will be seen that a very large proportion of the lode material is rock. It is customary in Sudbury mining practice to remove part of this rock by hand picking. The rest could be easily removed by flotation or some other mechanical process, but this is not desirable because a certain amount of siliceous gangue is necessary in order to act as a flux in the furnace for removing the iron. The rock gangue consists of quartz, or any of the country rocks or their altered equivalents. Calcite is rarely found.



Graphic representation of the relative amounts of sulphide rock gangue in several drill holes.



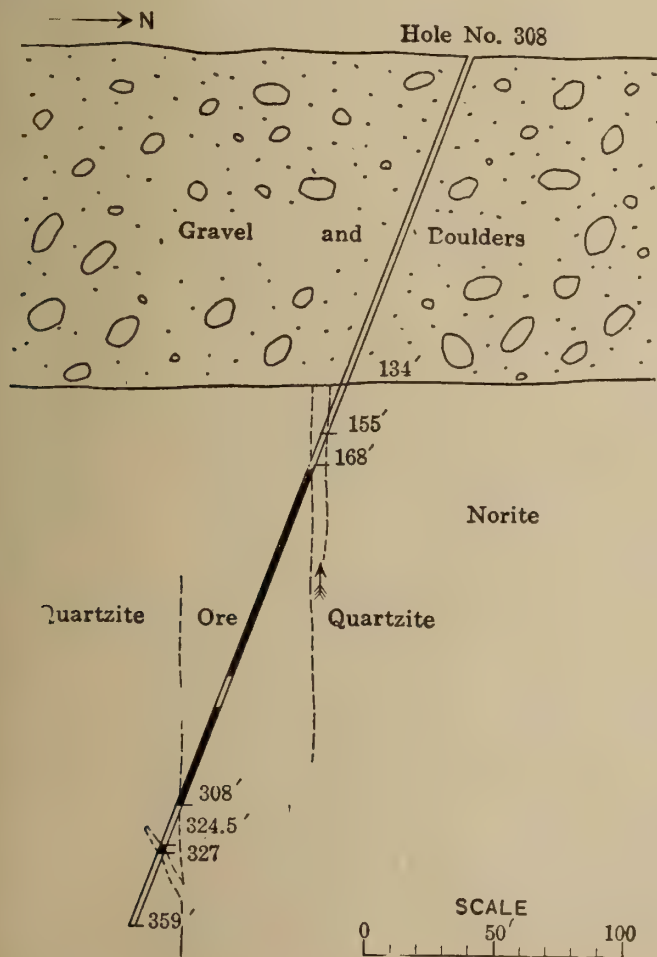
Curves showing percentage of nickel and copper in the ore from several drill holes.



The amount of chalcopyrite present seems to bear little relationship to the amount of rock, being as abundant in the rocky ores as in the richer ores. Pentlandite, on the other hand, increases as the amount of rock decreases, and bears a fairly constant ratio to the amount of pyrrhotite present. Analysis curves for copper, nickel, and combined copper and nickel, illustrate the same features. The "copper curve" has practically no slope from left to right (rocky to less rocky ores), while the "nickel curve," rises toward the right. A striking feature of this diagram is the complementary nature of the copper and nickel curves, maximums on the one curve being opposite minimums on the other, showing that where the copper is more abundant the nickel is less abundant.

The remarkable uniformity in the composition of the ore is noteworthy. The chalcopyrite is the most variable member; the pentlandite is somewhat more constant, while the pyrrhotite, except at the hanging wall, is invariably around 75 and 80 per cent.

Magnetite is present in the ore in small amounts, but its period of formation has not been determined. Pyrite has been observed in some of the core but the amount is negligible. It appears to be later than the other sulphides. In one place, a narrow band of galena was found cutting the mineralized norite. It is clearly a later introduction and not directly connected in origin with the orebody. Aside from these, no other sulphides have been detected, although a detailed study would undoubtedly disclose the presence of some of the rare nickel minerals such as polydymite, gersdorffite, etc.



Cross section of drill hole No. 308.

PERSONAL

Mr. T. J. Harwood, who was for some years manager of the La Rose silver mine at Cobalt, has been appointed to succeed Mr. S. A. Wooky as manager of the Schumacher gold mine in the Porcupine district, Ontario.

Mr. E. P. Mathewson left Toronto last week on an extended trip through the Western States and British Columbia. He expects to return to Toronto in about two months.

Mr. J. B. Tyrrell, who has been for some weeks in England, has returned to Toronto.

The following have been nominated, and will be elected by acclamation, as councillors of the Canadian Mining Institute for 1918-1919: Alfred Stansfield, N. R. Fisher, E. P. Mathewson, R. E. Hore, S. B. Wright, Jules Charbonnier, W. P. Williams, R. H. Stewart, Geo. Wilkinson and W. R. Wilson.

Prof. H. E. T. Haultain has been elected a vice-president of the Engineering Institute of Canada (Canadian Society of Civil Engineers). Mr. H. H. Vaughan is president.

Mr. R. Randolph Bruce, of East Kootenay, B.C., has gone to Honolulu, Hawaiian Islands, on a vacation trip.

Mr. Geo. H. Aylard, general manager for the Standard Silver-Lead Mining Co., operating near Silverton, Slocan, B.C., recently left Victoria for Southern California, to spend some weeks in that country.

Mr. Gomer P. Jones, general superintendent for the Hedley Gold Mining Co., has returned to Hedley, Similkameen, convalescent after having been operated on in a hospital in Vancouver, B.C.

MR. HANNA GOES TO PERU.

Toronto, Feb. 4.—Hon. W. J. Hanna, who resigned the office of Food Controller recently, will leave for Peru this week for the purpose of adjusting some matters between the International Petroleum Corporation and the Peruvian Government. Mr. Hanna is a director of the International Petroleum Corporation, which produces a considerable amount of crude oil in Peru. A part of the output is conveyed in tank steamers to the new refinery of the Imperial Oil Company at Vancouver, and a considerable quantity is used in the nitrate plants in Chile. These industries provide the raw material for the great powder manufacturers of the United States. It was generally understood in official circles that when Mr. Hanna quit the post of Food Controller he undertook to stimulate the production of fuel oil for the Admiralty, and of gasoline for the air service of both the British and United States War Departments. Mr. Hanna will be absent about two months.

The decision of the Nipissing mining company to discard the flotation process is an indication that very good results can be obtained by other means. The episode will help to show that unreasonable demands of patent owners can be met in many ways.

Up to date the charge that the Minerals' Separation North American Corporation is controlled by Germans has not been proven. So far as we know the charge is false.

Coal Production in Nova Scotia

By F. W. Gray.

Underneath is shown a tabulated statement of the production of the individual coal companies in Nova Scotia during the calendar year 1917, giving, in addition, the output of the companies during the war period and during the year preceding the commencement of hostilities:

Coal Outputs in Nova Scotia: (Ton of 2,240 lbs.)

	1913.	1914.	1915.	1916.	1917.
Dominion Coal Company—					
Cape Breton Collieries	4,739,139	4,287,717	4,608,979	4,091,790	3,551,800
Springhill Collieries	381,434	417,406	400,791	351,315	364,700
Nova Scotia Steel and Coal Co.	813,877	752,153	611,923	605,650	582,000
Acadia Coal Company	539,121	394,397	340,975	392,065	390,000
Intercolonial Coal Mining Company	189,550	213,289	177,977	143,748	180,000
Inverness Coal and Railway Company	293,847	264,842	245,749	265,427	195,000
Maritime Coal and Railway Company	155,051	141,830	175,482	197,101	203,000
Minudie Coal Company	65,562	65,147	79,760	54,191	30,000
Bras D'Or Coal Company	65,844	53,420	56,941	44,357	44,000
Greenwood Coal Company .....	.....	.....	.....	2,332	55,000
Milford Mining Company .....	.....	.....	.....	8,500	18,000
Stratheona Coal Company .....	.....	.....	.....	2,400	14,000
Sterling Coal Company .....	.....	.....	.....	.....	8,500
Fenwick Coal Company .....	.....	.....	.....	.....	3,500
Barnes Mine .....	.....	.....	.....	3,200	5,000
Sydney Coal Company	5,420	7,458	5,989	6,000	6,000
Fundy Mining Company .....	.....	.....	735	.....	5,500
Cape Breton Coal, Iron and Railway Co. ..	8,425	48,277	2,500	.....	.....
Royal Coal Company .....	.....	700	2,150	.....	.....
Atlantic Grindstone Company	2,718	709	.....	.....	.....
Other small producers	3,497	2,693	.....	3,348	4,000
Percentage of production in:	7,263,485	6,650,031	6,709,951	6,171,424	5,660,000
Cape Breton Island	81½%	81½%	82½%	81¼%	78%
Mainland Collieries	18½%	18½%	17½%	18¾%	22%
Reduction from the basis of 1913.		8½%	7½%	15%	22¾%

The most noticeable feature of 1917 production is the increase in the number of new enterprises. It is probable that during 1918 there will be many further additions to the list of producers, but it is expected that these smaller companies will increase their production, perhaps to an aggregate of 200,000 tons. In 1917 the new enterprises added about 100,000 tons of additional production. Nevertheless, it may be anticipated that the total output of the Province during 1918 will fall below that of 1917, and will, barring accidents or stoppages of work, be in the vicinity of 5,300,000 tons.

The explosion at the Allan Shaft of the Acadia Coal Company will cause a restriction of output, to what extent it is not yet possible to say. The chief restriction will in all probability not arise from the damage to the mine workings caused by the explosion, but from the loss of the labor of the 88 men who were killed by the explosion. The combined loss of life in the Waterford explosion of last July, and in the most recent disaster, is 153 men. The work of 153 men should produce 140,000 tons of coal in 12 months, and in the present state of the labor market, the loss of life referred to will bring about a reduction in coal production to that extent.

In making this observation, which admittedly is made from a purely materialistic standpoint, the

writer does not desire for a moment to infer that in any person's mind it takes precedence over the considerations of sorrow and suffering that are involved in these dreadful accompaniments of coal production. No person who lives and works among a mining population would be guilty of a suggestion of this nature,

but in view of the enormous value of coal to-day, and in view of the importance of coal as a decisive factor in a moral struggle, as a most potent weapon in what we believe to be a struggle of right ideals against the forces of oppression and error, not the least of the harm wrought by these explosions is the effect on the production of coal. The men who died in these two explosions lost their lives in the Empire's cause as truly as though they had died by German arms, and the loss of their productive labor is equivalent to the loss of fighting men in battle.

The origin of the explosion is as yet only a matter of conjecture. Full exploration of the mine and complete recovery of the bodies has been hampered by heavy falls of coal and stone, and by the rising of water in the mine owing to the pumps being stopped by the effects of the explosion.

It is to be hoped that the investigation which may be expected to follow will not be marked by the conflict between the scope of a coroner's inquisition and the work of a technical departmental commission which was observable in the case of the Waterford explosion, and it is further to be desired that any proceedings in the nature of a criminal prosecution shall only be undertaken by the direction of a commission or other competent body of eminent technical men.

Ontario's Mineral Wealth

The rapid growth of Ontario's Mineral industry may be gleaned from the following figures. The drop in 1914 is attributable to the outbreak of the war in that year.

Year.	Value.	Year.	Value.
1893.....	\$6,120,753	1914.....	\$46,295,959
1903.....	12,870,593	1915.....	54,245,679
1913.....	53,232,311	1916.....	65,303,822

ONTARIO IS CANADA'S PREMIER MINERAL PROVINCE, the 1916 production being 45 per cent. of the total output from Canada.

NICKEL: Sudbury produces 80 per cent. of the nickel of the world, and in 1916 the nickel-copper matte output contained 41,299 tons of nickel valued at \$20,649,279, and 22,430 tons of copper worth \$8,332,153.

SILVER: Chiefly from Cobalt and outlying camps, 20,007,367 ounces of silver, worth \$12,703,591, were produced in 1916. The total silver production from the Cobalt camp up to the end of 1916 was 255,322,297 ounces, valued at \$135,829,548.

GOLD: For 1916 the gold output was 497,833 ounces, valued at \$10,339,259. From the Porcupine camp the total production to the end of 1916 was \$28,200,322. Ore reserves of the producing mines at Porcupine are estimated at \$50,000,000. The Kirkland Lake camp comes next in importance.

DIVIDENDS PAID TO JUNE 30TH, 1917* EXCEEDED \$70,000,000 FROM THE COBALT SILVER CAMP, AND \$10,000,000 FROM THE PORCUPINE GOLD CAMP.

The total valuation of the chief metals produced in Ontario up to the end of 1916 is as follows:

Silver	\$151,428,500	Gold	\$33,663,648
Nickel	89,128,164	Copper	33,452,628
Pig Iron	76,544,482	Cobalt	3,180,990

A Recent Discovery in Northern Ontario

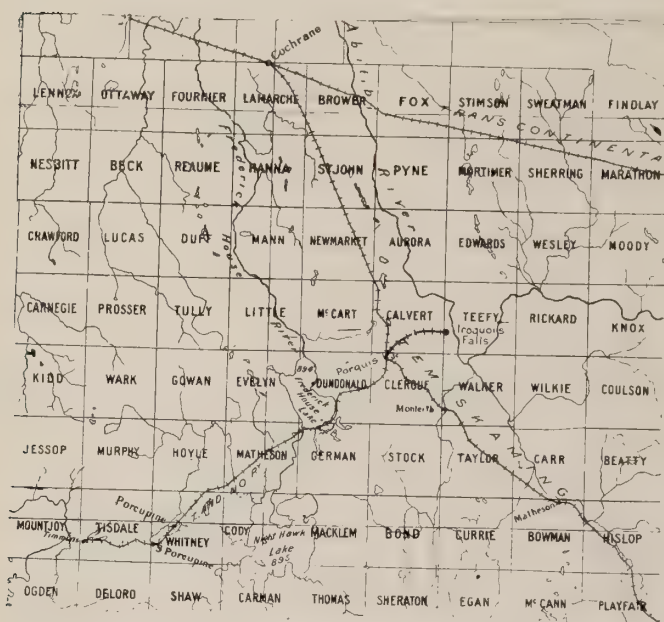
By Percy E. Hopkins

Ontario is at present Canada's chief gold producer, the output for 1916, largely from Porcupine, amounting to \$10,330,260. The success at Porcupine since 1910 has led to vigorous prospecting, resulting in other gold fields being opened from time to time, viz.: Swastika, Kirkland lake, Munro, Long lake, Kowkash, Powell, Rickard, Lightning river, and other localities. Rickard

The country is undulating, and superficial deposits consist of stratified clay through which occasional rocks rise as high as 100 ft. above the stream valleys. Much of the forest in this particular area was destroyed by the big fire in 1916.

Only a cursory examination has been made by explorers of the geology along the canoe routes. The rocks are pre-Cambrian, consisting of Keewatin pillow-lava schist (meta basalt) with subordinate areas of altered diabase and cherty iron formation, all of which have been intruded by narrow dikes of hornblende-granite porphyry and quartz-diabase, probably of Algonian and Keweenawan age respectively.

Gold was first found near the centre of the claim in a 3-inch quartz vein striking east and west in a rusty weathered carbonate schist. The main deposit, however, is on the north part of the claim and strikes east and west for at least 600 ft. The vein averages about six feet in width and has a vertical dip. Quartz,

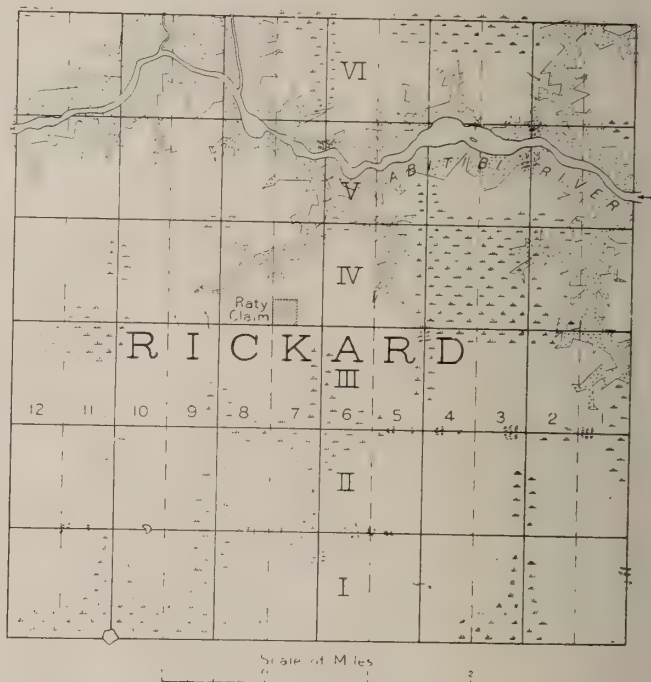


Sketch map showing position of Rickard township with reference to Iroquois Falls, Timmins and Cochrane

is one of Ontario's most recent discoveries. The township was named in 1902 after W. Rickard then M.P.P. for West Durham.

Rickard township is situated 100 miles north of Cobalt, 40 miles northeast of Porcupine, and 10 miles west of Abitibi lake. It can be reached by navigable water from the towns of Matheson or Iroquois Falls on the Temiskaming and Northern Ontario railway, or from Low Bush station on the Transcontinental railway.

In July, 1917, gold was found on the southwest quarter of the south half of lot 7, concession IV. of the township. The first discovery was made by a Finn named John Raty at a point 200 yards from a telephone line which runs from Iroquois falls to Couchiching falls on the Abitibi river and has been travelled for some years by the officials of the Abitibi Pulp and Power Company. Shortly after the discovery, representatives of two mining companies sampled the vein; but obtained low values. Later, in sinking, the prospector found a rich gold showing at a depth of five feet, which resulted in the Mining Corporation of Canada securing a working option. At present, January, 1918, the shaft is over 50 ft. in depth and much spectacular ore has been encountered.



Rickard township, showing location of the Raty gold discovery and topographical features. The stippled area will be flooded

the chief gangue mineral, has a milky appearance. Calcite occurs as a replacement mineral in the wall rock rather than in the vein itself. Tale and sericite are frequently met with, while feldspar is not so prominent. Among the sulphides, pyrite is the most abundant, there being also small quantities of copper pyrites, galena, and molybdenite. Molybdenic oxide and native copper are secondary minerals near the surface. The gold,

which is extremely coarse in places and varies in color from light to dark yellow, occurs in crushed portions of the quartz with tellurides and other minerals, the gold usually crystallizing out after the tellurides. In the samples examined two tellurides have been identified, viz.: tetradymite (bismuth telluride) and altaite (lead telluride). A silver telluride may be present, as

considerable silver was found on analysis. The magmatic waters connected with the porphyry intrusions may have had much to do with the ore deposition.

The Mining Corporation of Canada is meeting with encouraging results so far. A small steam plant is in operation and diamond-drilling will be done. One may expect to hear more of this property in the near future.



Gold from a recently discovered deposit in Rickard township, Northern Ontario

This specimen is from the Raty claim, which is being worked under option by the Mining Corporation of Canada. The Raty claim is near the centre of Rickard township, about 10 miles west of Abitibi lake.

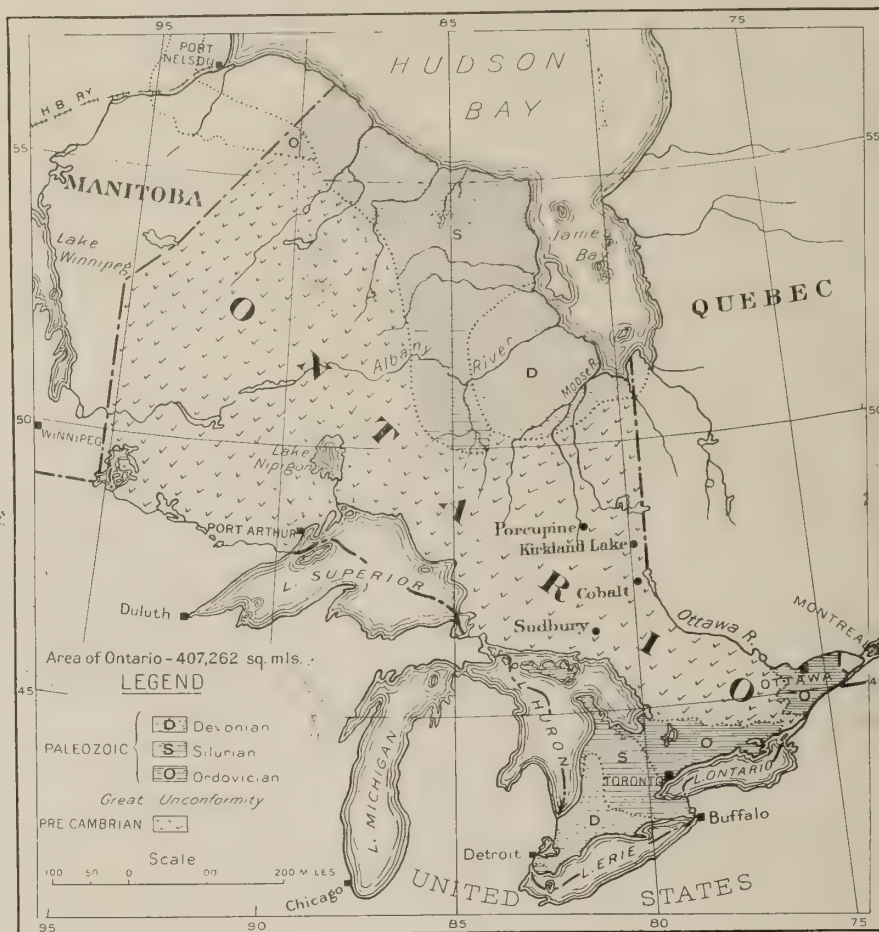
The illustration shows a smooth polished surface and the rough natural fracture.



PROVINCE OF ONTARIO

DEPARTMENT OF FORESTS & MINES
OF LANDS
BUREAU OF MINES

GEOLOGICAL SKETCH MAP OF ONTARIO



The area of Ontario is 407,262 square miles, 70 per cent. being pre-Cambrian, which is pre-eminently the metal-bearing formation of the Province.

Ontario's mineral resources cover practically the entire list of metallics and non-metallics with the exception of tin and coal.

The producing camps are readily accessible by railway, the climate is invigorating and healthful, water power is near at hand, and other conditions are favorable for mining.

FOR GEOLOGICAL MAPS, ILLUSTRATED REPORTS, MINING LAWS, AND LIST OF PUBLICATIONS, APPLY TO

ONTARIO BUREAU OF MINES

PARLIAMENT BUILDINGS
TORONTO, CAN.

There should be no suppression of pertinent facts. The newspapers have published a statement on the authority of leading officials of the Acadia Coal Company that the proximate cause of the disaster was a "bad shot." If this is the case, the full facts should be disclosed, for it is a significant fact that every coal mine explosion of any magnitude that has occurred in Nova Scotia had for its proximate cause a "bad shot," either a "flaming shot," a "blown-out shot," a "windy shot" or some one of the various forms under which blasting shots are classified which, instead of expending their explosive energy on the coal, expend their force in the mine atmosphere.

Obviously, the firing of blasting shots should be confined to cases where no other method of coal extraction is feasible, or to hours when large bodies of men are not present in the mine. In some cases, it is open to question whether the larger and cheaper extraction of coal which has been rendered possible by the use of explosives has not in the long run been nullified by the loss of life and property, and of production, by disasters directly attributable to their use.

Whether the total abolition of the use of explosives in coal mines is possible or not is a matter that is conditioned by economic conditions that affect alike the miner, the operator and the consumer, because such a prohibition would increase the cost of coal enormously and would, for a long time, greatly reduce the rate of coal production, but it may be conservatively stated that all steps which tend to the restriction in the quantity of explosives used in coal extraction constitute progress in the right direction, and in the direction which will be followed in the future evolution of mining practice.

NEW YORK MEETING A.I.M.E.

New York.—War work for the mining engineer and a concentration of his efforts to meet the mineral needs of the country, will be the subjects to dominate the 116th meeting of the American Institute of Mining Engineers. The meeting opens in New York on February 18th, and continues for four days. During the sessions prominent men who have been in the center of war activities in this country and in Europe will address the gathering, and mining engineers from every part of the country will study means of solving the war mineral difficulties.

About 50 technical subjects will be presented at the Institute meeting. Some of them deal with such timely topics as the economy of electricity over steam for power purposes in and about the mines, the erosion of guns, extraction of gasoline from natural gas, the Chilean nitrate industry and the employment manager and labor turnover reduction.

An elaborate entertainment program has been arranged both for the Institute members and the ladies accompanying them. On Monday evening, February 18th a war smoker will be held. On Tuesday evening a novel entertainment, and on Wednesday a "Hoover dinner" at Hotel Biltmore. Herbert Hoover is one of the few honorary members of the Institute.

On Thursday, the last day of the convention, an all-day excursion will be made to Princeton, N.J., to visit the government aviation field and University campus.

Some of the features of the entertainment of ladies are a visit to the art galleries of Senator W. A. Clark and of Henry C. Frick, a matinee, a tea and several luncheons at the Engineering Societies' Building.

Metals and Metallurgical Research*

By S. F. Kirkpatrick.

The metals have played an important part in the development of civilization from the earliest historic times, down to the present. They have been a factor in determining the fortunes of war. The bronze armed warrior drove out the man of the stone axe and the iron equipped soldier in his turn subdued the bronze armed races. History tends to show that the claim "the strength of a nation can be judged by the success with which it practises the metallurgical arts" has a true foundation.

This is not, however, generally appreciated, and the Japanese in his worship of his sword and the sword-maker is an exception rather than the rule. The iron worker has held an honorable position as typifying honest toil rather than as holding a position in the fore-front of the civilization of his country.

To-day as never before the rulers of the nations recognize the part that the metals play in determining the fate of nations.

Great Britain was the greatest coal, iron, and general metal manufacturer of the 19th century and as such was secure in her premier position among the nations. Germany, however, early recognized the need of iron and steel for the furtherance of her scheme of conquest and as early as 1870 exacted from France as penalty of defeat what was then supposed to be practically all the iron fields of the Minette district of Alsace-Lorraine, the most important iron ore reserve in Europe.

With this resource and her own coal fields around Essen, Germany then proceeded to foster her steel industry, increasing her steel production in the quarter of a century immediately preceding the war almost twelve times from 1,600,000 metric tons in 1888 to 19,300,000 metric tons in 1913. During this time Great Britain's output increased only two and one-half times from 3,000,000 metric tons in 1888 to 7,500,000 metric tons in 1913. That is, at the beginning of the quarter century preceding the war, Great Britain produced twice as much steel as Germany, while at the end of that period Germany's production was two and one-half times that of Great Britain. Fortunately the production of the United States increased almost thirteen times during this period from 2,400,000 metric tons to 31,000,000 metric tons.

How Germany Prepared for War.

It is interesting to note that preparation for hostilities was probably one of the chief causes of the activity of the German steel industry during the years immediately preceding the war. For instance, part of the energy of the iron manufacturer was directed to the building of the strategic railways on the East and West fronts that in many cases were required for no other purpose than that of the rapid mobilization of troops. The German steel industry also led in the production of war munitions, such as the manufacture of cannon. The Belgian forts were equipped with Krupp guns that could be blown to pieces by larger guns manufactured in the same works.

It might also be said that Germany's success in the manufacture of steel was an important factor in encouraging her to defy the other powers of Europe.

When war started the main strategy of Germany was to cripple France in her coal and iron resources and by

*From an article published in Queen's Quarterly.

the advance through Belgium into the northern part of France Germany came into temporary possession of almost all the iron and coal of continental Europe. This would have been disastrous to French hopes if it had not been that Great Britain was ready, pressed though she was, to come to her assistance. We are only beginning to understand now how serious the situation was in the fall of 1914.

Germany was not so well situated in regard to some of the non-ferrous metals especially copper, as she was manufacturing only three per cent. of the world's copper before the war, while consuming thirty per cent. But even in this industry we can see her appreciation of the metals, as some of the copper mines were said to be operating at a loss before the war and were being kept open only by government aid. This was then said to be a splendid example of the paternalty of the German government that wished to keep this industry on its feet so as not to have to throw so many miners and metallurgists out of employment. Now we are able to appreciate that there may have been other reasons for Germany's encouragement of this industry.

War Has Emphasized Importance of Metals

Since the war started, needless to say, all those closely in touch with military operations recognize the value of the metals as they are required for all parts of the huge army and navy machines. Never before has the need of replacing manual labor with machinery been so keenly felt in the industries.

Even an industry such as agriculture, often rather antagonistic to the industrial life of the country, is becoming more than ever dependent upon the metals and their successful manufacture into farm equipment. As an example, when Great Britain was first confronted by the intensive submarine war the authorities recognized the need of developing her neglected agricultural resources, but they had no men to throw on the land. It was to the machine manufacturer that they appealed and thousands of farm tractors were rushed over from the workshops of America to take the place of the army of men that would otherwise have been required.

The great need of metals is to-day emphasized by the recognized necessity of steel for ship building. The iron manufacturing resources of the United States, great though they are and stimulated by high prices, are being taxed to the utmost. Government orders take first place and the civilian consumer has often to wait. The tendency is to curtail all uses of metal that are not of immediate national importance.

This growing importance of the metals is not only a war effect, for the annual production of iron and steel in the United States has regularly doubled every ten years for the last century, and the end is not yet. Only part of this increased production is due to the increase of the population of that country as the production of iron in the world has increased about fifty per cent. for each decade for the last century.

This increase is followed by the other metals, copper having increased about six-fold in forty years and the latest addition to the family of common metals, namely, aluminum, showed a tenfold increase in the first decade of its use and a tenfold increase during the second decade. It is too early to say what the increase will be during the third, but it will be a very large one.

Increased Use of Alloys.

Not only is there a steady increase in the production and consumption of metals but in the variety of alloys or mixtures of metals employed in the industries.

Every part of the modern complicated machines of industries, of railroad equipment, army equipment, naval force or flying machines, is studied in order to adapt to each the metal or alloy best fitted to give the greatest service.

This entails a knowledge of metallurgy undreamed of fifty years ago. Now we use iron alloyed with various proportions of one or several of the following elements: Carbon, silicon, manganese, copper, chromium, tungsten, molybdenum, nickel, cobalt, uranium, titanium, vanadium, zirconium, aluminum.

Many of these elements are so important in conferring valuable properties on steel that it has been suggested for each in its turn that a nation cut off from its use could not wage a modern war. This claim has been made in technical and popular literature for nickel and it is only a short time ago that the Ontario people and press were much exercised over the chance that some of the nickel of Canada was finding its way to Germany. Chromium is as essential as nickel in manufacturing armour plates and projectiles.

A strong claim has been made for the vital importance of tungsten. This metal is used in the production of high speed steels and it has been claimed that if this metal could not be obtained the ability of the workshop to produce shells and other war materials would be reduced to a fraction of their present capacity due to the fact that the ordinary carbon steel cuts so slowly. Manganese is another metal almost essential to the manufacture of steel, and America is feeling a shortage of this metal at the present time.

Importance of Metallurgical Research.

The metallurgy of to-day is becoming a well-developed science, while only fifty years ago it could be considered an art. The properties of metals are determined by the chemist and metallographist with the assistance of physical testing laboratories rather than, as formerly, by the artisan. It is therefore to the trained chemist and metallurgist that we look for development in the production and use of the metals. Research of an industrial and scientific nature is becoming a more important factor.

This work has a bearing on the problem of the shortage of labor. In connection with the production of the metals themselves the tendency is to develop processes for the treatment of ores that will require few men to operate them. We now have large mills crushing and concentrating ten to twenty thousand tons of ore per day, operated by a mere handful of men.

Research also tends towards the elimination of waste. Twenty years ago most of the concentrating and metallurgical plants would have thought they were doing good work if they recovered 70 per cent. of the metals in an ore, now 90 and 95 per cent. would be expected and obtained. There has also been a development in the method of treating refractory ores containing a mixture of several metals. A few years ago the smelter would have been content to treat the ore for the recovery of one or two of the metals and to let the others go to waste. The modern metallurgist is not satisfied unless he is extracting and marketing all the metals in the ores. Much has been done in this line, but there is still much to do, though each year as it passes sees important gains made.

The war has only intensified the need for these economies and emphasized the need for all the metals we can produce. It also shows the necessity of a country adapting itself to its own resources. This is

forcing a greater development in the science and industry of metallurgy than that experienced before the war.

On account of the closing of certain trade routes and the shortage of shipping facilities, America is thrown largely on her own resources. No longer can she depend on the sulphur from the pyrites of Spain or on the manganese from Russia and India, nor altogether on the chromium of New Caledonia or Africa, or the tungsten of India. The metallurgists of America can and are replacing these ores by intensive search into the mineral resources of the country and by developing deposits formerly considered unworkable. New metals are also being developed and new alloys manufactured.

Canadian Resources Should Be Developed.

What is Canada's part in this work? We who are sending 500,000 men to France are one of the principal metal producing nations of the world and have a responsibility in regard to this development in metallurgy and the adapting of our metal resources to war requirements.

It is only within the last fifteen or twenty years that Canada has been actively developing her mineral sources and manufacturing metals, but she already takes an important place in the production of iron and steel, copper, lead, aluminum, and is the fourth country in order of gold production. This country also produces one-eighth of the world's silver, one-quarter of all the arsenic consumed on this continent, and has the leading place in the production of asbestos, nickel, and cobalt. Only within the last two years under stress of war conditions metallurgical researchers have added metallic zinc and metallic magnesium to the list of her products.

The main object at the present time must be the intensive production of those metals of prime importance for war purposes, but almost all of the metals mentioned come under this head. Steel, formerly so largely used for structural purposes, is in greater demand for war munitions and ships, copper for brasses, lead for munitions rather than paint, aluminum for army equipment and flying machines, and silver, generally considered as a luxury, is in greater demand than ever for the manufacture of currency. Canada supplies the arsenic for the insecticide requirements of over 25,000,000 people. Nickel is primarily a war metal, and cobalt, although used before the war practically altogether in the ceramic industry, is now largely consumed as an ingredient of high speed steel and in the manufacture of the new tool metal, stellite, used largely for the turning of shells.

The mining and metal production of Canada will be an important factor in post-war conditions, as an abundance of metals will be required during the building up stage, and with the influx of labor Canada should be able to supply these from her developed and undeveloped resources.

One of the few Nova Scotia coal operators to consistently increase output during the war is the Maritime Coal & Railway Co. This company leased two new areas from the Minudie company and increased its output to 203,887 tons in 1917. As Mr. Gray shows on another page, Nova Scotia has been unable to maintain its output when it is most needed. The coal is available, but the mines are short of men and ships are scarce.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Nipissing.

An average production of nearly eleven thousand dollars per day was the record established by the Nipissing Mining Company for the month of December, during which month the company mined ore of an estimated net value of \$340,793, and shipped products from Nipissing and customs ore of a net value of \$376,433. Several new crosscuts and drifts were started during the month, but no new veins were encountered. The underground work during the month was very similar to that of November. Shaft No. 63, which has been idle for two years, is being pumped out and will be in operation again in the near future. A diamond drill will be started shortly drilling in a possible favorable area of the diabase on claim R. L. 407. In his report to the directors, Mr. Hugh Park stated that the high and low grade mills were both busy with the annual clean-up. During the month the high-grade mill treated 71 tons and shipped 401,869 fine ounces of bullion, the low grade mill treated 6,281 tons. The year recently closed by Cobalt's premier mine was the best in its history, the earnings of the company amounting to \$3,358,973, the December output being nearly double that of the first month of the past year. The future outlook of the company with the prevailing high price of silver is indeed very bright.

Kerr Lake.

The production of silver at the Kerr Lake mine is being maintained at a rate of nearly seven thousand ounces per day, or about two and a half million ounces per annum. This figures out at close to \$6,000 per day with a net profit of about \$4,000 every twenty-four hours. With a substantial margin of profit, the Kerr Lake is maintaining its position as the third largest silver producer in the Dominion of Canada. Ore reserves of upwards of three million ounces were recently estimated officially, and the silver deposits are steadily being proven to extend beyond previously known limits. The company is becoming increasingly active in the prospective field, and at the present time are meeting with favorable results in the development of the Mondeau claims in McElroy township of the Boston Creek district, which they have had under option for some time. A system plant has been installed on these claims and development work is being carried on systematically.

Mining Corporation.

The Mining Corporation of Canada, which is the greatest silver producing company in the British Empire, has been adding to its Canadian properties located in Northern Ontario at a rapid rate, and at the present time owns and operates: the Cobalt Lake mine, the Cobalt Townsite Mine, the City of Cobalt mine, the Townsite Extension mine, the Little Nipissing mine. These properties comprise a total of 186 acres and are located in the Cobalt Camp. This powerful corporation at the same time has under option: the Waldman mine (silver) 87 acres, the Alexander (silver) 20 acres. Both of which are located in the Cobalt Camp: the Hylands property (silver) 260 acres, located in the Gowganda Mining District, and a gold property comprising 120 acres in the township of Rickard. According to unofficial reports, the production of silver for the company from its Cobalt properties for 1917 will total over 5,000,000 ounces. During the years 1915-1916 the com-

pany produced approximately 4,500,000 ounces. Owing to new processes of treatment installed, the company can now treat with a profit the huge amount of tailings which have been accumulating in the bed of Cobalt Lake, from which it is estimated that considerably over one million ounces of silver will be obtained. The Mining Corporation is entirely a self-contained plant which reduces its own ore to the form of bullion for shipment.

Temiskaming.

The Temiskaming mining company, which is the centre of a good deal of controversy at the present time, may be said to enjoy a fairly strong financial position. According to a statement issued on November 1st, the Temiskaming had \$441,862 in cash on hand, together with 298,554 ounces of silver, either in storage, due from the smelter, or bagged at the mine. The value of these quick assets with silver at 90 cents per ounce would be about \$710,000. The ore reserves still in the mine should yield a probable net profit of \$300,000, so it may be said that there is not far under one million dollars back of the Temiskaming mine. Since this report was made, one dividend of \$75,000 as been paid. The company has under option and is developing the Hoheuner claim No. L 5433, in the Kirkland Lake gold area. In addition to this the company owns the North Dome mine in Porcupine. The plant from the latter property has been moved to the Hoheuner claim at Kirkland Lake for the purpose of carrying on an extensive exploration campaign there.

Ore Shipments in 1917.

The total amount of ore shipped from the Cobalt Camp during the year 1917 was approximately 21,000 tons. This compares with 15,050 tons the preceding year and about 16,000 in 1915, and about 18,220 tons in 1914. This marked increase in tonnage is more remarkable when it is remembered that at the present time the various mills in the camp are treating greater tonnages of their ore at home than ever before in their history, and shipping the product in the form of bullion.

Trethewey.

The shareholders of the Trethewey mining company have decided to acquire a controlling interest in the Castle mining company, which owns claims adjacent to the Miller Lake-O'Brien mine in the Gowganda district, and which are said to include a portion of the contact along which the latter company are mining high grade silver ore. J. P. Bickell, of the McIntyre, and H. D. Symmes, of the Boston Creek mine, are identified with the Castle mining company.

Provincial.

New development work is to be done between now and spring in virgin territory contiguous to the older workings in the Provincial mine at Cobalt, according to recent reports. The mill at the property is said to be working twenty-four hours a day and giving splendid satisfaction. The management is now considering the installation of oil flotation equipment. It is considered probable that this will result in better extraction.

Coniagas.

According to the recent annual statement of the Coniagas mining company, ore reserves at the property were estimated to total 5,347,090 ounces of silver. This estimate included the sand and slime tailings which are estimated to contain 859,500 ounces. With the distribution of a two and one-half per cent. divi-

dend February 3rd, the company has distributed to its shareholders a total of \$8,840,000 in dividends.

Nipissing Discards Flotation Process.

The Callow flotation plant, at the Nipissing mine, is being discarded and preference is being given to the cyanide process. One factor which has much to do with the decision of the Nipissing is that great difficulty is experienced in treating and marketing the flotation product. Another feature is the possible litigation with the Minerals Separation Company, who claim control of the flotation patents. By the use of Wilfley tables, followed by cyanide, the Nipissing company find it possible to turn out a much more satisfactory concentrate, which is easily refined and made ready for the market in the form of high grade bullion.

Crown Reserve.

The Crown Reserve mining company, during the year 1917, made a net profit of nearly \$80,000 more than during the preceding year. The mine profit for the year 1917 amounted to \$82,572, as compared with \$2,973 during 1916. With a balance of \$770,533 carried forward from 1916, the profit and loss account shows a total of \$980,079, and after paying head office superintendence, taxes, depreciation, prospecting and exploration totalling \$148,314, the surplus was \$781,765, as against a surplus last year of \$770,533. The above statement of earnings at the mine came as a considerable surprise to the shareholders of the company, in view of the reports given out at the previous annual meeting. According to a recent report from New York, the Crown Reserve is said to be interested in a placer property near Idaho Springs, Colo., and is said to have obtained satisfactory results from diamond drilling operations. The company has also secured an option on the Welsh claims in the Gowganda district and has installed a three-drill compressor plant with two 40 H.P. boilers and other necessary equipment to thoroughly explore the property on which a number of promising veins were in evidence on the surface.

Adanac.

The vein along which the Adanac is drifting at the 310-foot level continues strong, and the geological conditions are considered favorable, being identical with those predicted in the recent geological survey of the property. Towards the north end of the Adanac the diabase dips sharply, and on the Prince claim to the north of the Adanac the diabase is within 250 feet of the surface. In the basin between the present workings of the Adanac and the Prince claim is the zone wherein leading geologists believe ore deposition is likely to occur, and it is this section the Adanac propose to develop.

Keeley.

The Keeley property, in South Lorrain, although it is considered one of the best silver prospects in the north country, is idle, owing to the fact that it is under option to an English company which is not bound to exercise its option until one year after the war. This arrangement, perhaps more than anything else, is serving to retard development in the South Lorrain district. In the early days of its operation the low price of silver, and financial mishaps, served to curtail operations. There are other properties in the immediate vicinity of the Keeley with considerable merit and there are quite a number of prominent mining men who still pin their faith in the future of South Lorrain and believe that prosperous days for that district will again be realized.

Pittsburg-Lorrain.

Mining operations at the Pittsburg-Lorrain (formerly the Currie property) are being attended with satisfactory results. During the past few weeks the mill at the Wettlaufer property which is under lease to the former company, has been kept going on ore from the Wettlaufer. However, a change has now been made and ore from the Currie is being treated. It was at one time thought that milling operations would have to be suspended during the winter, but such has not proven the case. At the present time, crosscutting at the third and fourth levels is under way, and the general outlook is said to be satisfactory. A diamond drill is also being used in the exploration of the property.

Chambers-Ferland.

A number of narrow but promising veins have been cut in the exploration work along the contact at the Chambers-Ferland property of the Aladdin-Cobalt mining company, but nothing of unusual importance has as yet been encountered, although geological conditions continue favorable.

Huronion to be Re-opened.

Once more arrangements have been made for the re-opening of the old Huronia Mine, in Gauthier township, about twelve miles east from Kirkland Lake. The Huronia has had a somewhat checkered career. For a time it was under option to the Timmins interests, during which time extensive diamond drilling operations were carried on, and a quantity of ore was proven; but not sufficient to warrant exercising the option. A small but more or less out of date mill is on the property. A number of men are now engaged in general work preparatory to the opening of the mine.

Alexo Nickel.

The Alexo Mine, at Porquis Junction, is shipping about a million pounds of ore per month to the Mond Nickel Company, at Coniston. It is understood to be the intention of the management to sink the main shaft to a depth of at least one thousand feet.

Plant on Mondeau Claims.

A steam mining plant has been installed on the Mondeau claims, in the township of McElroy, which are under option to the Kerr Lake mining company, of Cobalt, and a comprehensive plan of exploration and development has been mapped out. Until recently the property was being developed by the use of hand steel, but the installation of the steam plant will speed up operations considerably. According to latest reports, considerable encouragement has been met with at the property.

Davidson.

Early in February it is expected the new mill on the Davidson property will be in operation, which will add another producer to the growing list of Porcupine mines. During the past eighteen months the Davidson has been explored and developed very actively, the results being met with affording good reasons for optimism as to the future of the property. Milling operations will be watched with keen interest for the next few months.

Tough-Oakes.

It is expected that the first annual report of the new management of the Tough-Oakes Mine at Kirkland Lake will be a favorable one. The increased costs of mining and milling for the past year are expected to disclose smaller profits on operations for the year. How-

ever, the physical condition of the mine is understood to be very satisfactory, and it is in this direction that the report is expected to be optimistic. The mine has been developed to a depth of 500 feet, the main shaft having been sunk 400 feet, and this has been supplemented by a winze to the 500-foot level. At each level from the 100-foot down lateral work has been carried on with favorable results. An intrusion of diabase which has been present from the surface down to the present lower workings has served to shorten a number of the ore shoots. Despite this fact, however, there seems to be no reason to doubt that operations will not be carried on with good results to much deeper levels. The first report of the new management is being awaited with more than ordinary interest.

Lake Shore.

The mill at the Lake Shore Mine in Kirkland Lake should be completed by the middle of the present month and by the first of March, at the latest, the mine should be among the list of producers. The mill is among the most modern in Northern Ontario and will have a capacity of close to one hundred tons per day. The ore to be treated has an average value of upwards of \$15 to the ton, and a considerable margin of profit should be shown. There is a large tonnage of ore blocked out underground, besides considerable which has been conveyed to the dumps and can now be sent to the mill with a minimum of effort. The physical condition of the mine would appear to show that no difficulty will be experienced in keeping the ore reserves well in advance of the requirements of the new mill. About the last of January the downward continuation of the main orebody was encountered at the 400-foot level. The width of the vein at this point is approximately 22 feet and for the greater part the ore will average around eight or nine dollars to the ton, while two streaks appear in the vein in which the values are exceptionally high, particularly the last four or five feet passed through along the north wall, where visible gold is liberally sprinkled through the ore. Drifting towards the west was started without delay. Previous to the cutting of the vein at this depth the main workings of the mine were at the 200-foot level, where the results being met with were highly satisfactory. Proving the main orebody to continue to the 400-foot level and maintaining its splendid grade of ore is of the utmost importance to the Lake Shore, and also affords a good deal of satisfaction to those interested in the Teck-Hughes on the west and the Wright-Hargraves on the east, proving as it does the remarkable consistency of the vein system and the mineral deposition.

Porcupine Crown.

The Annual report of the Porcupine Crown mining company, as of December 31st, 1917, is not altogether favorable. The heavy decrease in ore reserves from that of a year ago came as quite a surprise to many. At the end of 1916 the ore reserves of Porcupine Crown were estimated to be \$1,050,000. During the year 1917 the company mined \$364,703, which on the basis of the 1916 ore reserves would leave \$685,297. It is, therefore, somewhat of a surprise to note that the management report only \$610,000 ore reserves left in the mine. During 1917 the workings of the Porcupine Crown were carried to a depth of 1,000 feet, where ore is understood to have been determined, yet there has been a cut in the amount of ore reserves to the extent of \$75,297 in excess of the gold produced. The only explanation which can be found is that the estimates for

the year 1917 are much more conservative than those of the year previous. After paying for mining, milling, allowing for depreciation, taxes, etc., the mining profits were \$109,421, against \$270,130 in 1916. Mr. S. W. Cohen, general manager, said that production had been seriously hampered by a cave-in at the mine during the month of April, which affected operations for about two months and a half and resulted in a considerable quantity of ore still being tied up in the mine. Labor troubles and high cost of materials had also been a detrimental factor in production, resulting in the reduction of dividends. Mr. Cohen further stated that no new ore bodies had been discovered during the year and that ore reserves had been decreased practically by the amount extracted.

Teck-Hughes.

Drifting at the 500-foot level of the Teck-Hughes mine is being attended with good results, according to recent information. The drift is to be continued to a point directly beneath the main shaft, where a raise will be put up to connect the shaft with the 500-foot level. A drift is also to be run from the winze at the 600-foot level to a point beneath the main shaft, where a raise will also be made to complete the shaft to the depth of 600 feet. A large station is to be cut at the 500-foot level and a rock crusher will be installed at this point, the intention being to make this the main haulage way of the mine. Here the ore can be released from the chutes directly into the cars and in which it will be trammed to the underground crusher, where after being reduced to the required fineness, it will be hoisted to the surface for treatment in the mill. The physical condition of the mine is officially stated to be very satisfactory. Since the closing down of the Kirkland Lake Gold, the Teck-Hughes has the distinction of being the deepest operating mine in the Kirkland Lake Camp.

Molybdenite Mining Encouraged.

It is anticipated that there will be considerable scouting done for molybdenum properties in the north country since the announcement by the Dominion Government that the export taxes on the product has been removed. Heretofore the molybdenum mine operators of Canada had a very narrow market for their product and secured perhaps the smallest price of any of the allied countries. The removing of the embargo will provide a much better market for the metal. The molybdenum deposits of Northern Ontario and Northern Quebec, the latter along the Transcontinental railway, should now be in line for considerable attention.

Vipond-North Thompson.

With the 100-ton mill running at almost full capacity and with mill heads recently being bought up to ten dollars per ton, the operation of the Vipond-North Thompson property is understood to be resulting in increasing profits. The mine is being quietly but aggressively developed and the outlook never appeared more favorable. The mine is now in a position where it should respond rapidly to more favorable labor conditions, and a return to pre-war conditions would find the property in excellent shape. The management have deferred the enlargement of the mill until conditions for accomplishing this work are more favorable. Although developments at the property have been confined largely to the main vein, the exploration conducted by diamond drill a few months ago has determined the presence of other valuable ore deposits. The property is bounded on the north by the Hollinger Consolidated

and on the west by the Porcupine Crown, and it is expected a continuation of many of the orebodies of these properties will be found on the Porcupine V.N.T.

Thompson-Krist.

Arrangements have been completed for the commencement of work on the Thompson-Krist property in Porcupine. The work is to be carried on by the Porcupine V. N. T. company from the 400-foot level of the latter mine. The geological conditions are quite favorable to the proving of ore on the Thompson-Krist and the general trend of some of the veins of the Vipond are in a general direction of the Krist.

Skead Mines.

Development work is being pushed ahead vigorously on the properties of the Skead Mines, Limited, in the township of Skead. A force of twenty-eight men are employed at the mine and the shaft has already reached the 100-foot level and a station is being cut preparatory to the commencement of cross-cutting for the purpose of tapping the various veins in evidence on the surface, and which have been indicated at depth by diamond drilling the mining plant consists of a four-drill compressor, hoist and 120 h.p. boiler. Although the Skead Mines is the major operation in this township, there are a number of other promising prospects in that district, among which is the Fidelity Mining company's property, on which arrangements are being made for the beginning of operations in the near future.

White Reserve.

Operations on the White Reserve property in the Elk Lake district are going ahead uninterruptedly. A large mining plant and a full crew of men are employed. A twelve drill compressor and adequate mining equipment to carry on operations to depth is installed. At the present time a cross-cut is being driven at the 140-foot level, with the expectation of encountering the continuation of the veins in evidence on the surface. The White Reserve has been in operation almost continuously for the past two years and is unquestionably the most consistent effort at mine making in the Elk Lake District. The formation is diabase and although very promising, the property is still in the prospective stage.

A Silver Discovery.

A promising silver find is reported to have been made south of Cobalt, at mileage 64 on the T. & N. O. railway, and consists of a four-inch vein, containing silver values. The rock formation in the vicinity is diabase and Keewatin, with some Laurentian and a small area of conglomerate. Already the district is receiving the attention of Cobalt mining men, but up to the present nothing sensational has developed.

Lightning River Claims Sold.

A deal for the Lightning River claims, on which spectacular gold discoveries were made last fall, has been consummated and a second cash payment was made in Haileybury recently. The purchase was made by Mr. George Young, representing strong United States interests, who at the present time are carrying on extensive mining operations in the Western States. This is their first venture in Northern Ontario mining fields. It is understood that a mining plant will be installed without delay and the exploration of the property commenced.

Ankerite.

The downward continuation of the orebody at the Ankerite property of the Coniagas Mining Company in Porcupine has been encountered, at the depth of 200

feet. The orebody is well mineralized and is quite up to the expectations of the management. The three-compartment shaft on the property is being driven to the 500-foot level at record rate. When this level is reached a large station will be cut and lateral work will be undertaken both on the Ankerite and the Maidens-McDonald property, which is also owned by the Coniagas Mining company. It is expected the ore depositions from the Ankerite will be found to continue into the Maidens-McDonald. Results obtaining from present development and results encountered in diamond drilling indicates the Coniagas company have a valuable acquisition in their Porcupine properties.

BRITISH COLUMBIA.

Dissatisfaction has increased among mine operators, as more and more of them have come to realize what a heavy levy last year's tax legislation, which came into effect on January 1st of this year, will make upon them. Various Boards of Trade have taken the matter up, and prominent mine managers have also protested against this additional burden being placed on the mining industry of the province, this being additional to the taxation provided for by the Dominion Government last year. Whether the Provincial Government will or will not take steps at the forthcoming session of the local Legislative Assembly to meet the requests of mining men and others interested, is not yet known. Meanwhile it is claimed that this changed attitude of the government towards the mining industry is having the effect of deterring outside capitalists from putting more money into mining enterprises in the province.

In an official bulletin, issued last month by the British Columbia Department of Mines, there is included a statement which shows the dividends declared by metaliferous mining companies during the calendar years 1913, 1914, 1915, and 1917. The total for 1917 is made to appear to have been \$3,800,847, but in order to make this larger showing than in other years, two companies appear to have been credited with the dividend payments of five quarters each instead of four. The Consolidated Mining and Smelting Company, Trail, is credited with \$1,258,438, and the "Standard Silver-Lead Mining Co., Silvertown Co., Grand Forks" (which, presumably, is a careless misprint for the Granby Consolidated Mining, Smelting and Power Co.) with \$1,874,210. Now, each of the companies—the Consolidated and the Granby—paid four dividends in 1917 at the rate of 10 per cent. per annum, so it is quite evident the official figures have been improperly inflated. It is true, footnotes appended state that there are included \$261,935 for the one company and \$374,362 for the other, "earned and declared in 1917, but payable January, 1918," but even that does not justify the inclusion, in a statement purporting to show the year's dividends of one quarter each for two companies, the amounts of which had been included in the 1916 total. The misstatements were easily avoidable, since several newspapers and journals had already published dividend figures that were within a few dollars of being correct. Further, the Granby Consolidated Co.'s issued capital was \$14,998,520 at the close of its year ended June 30, 1916, and \$15,000,042 as at June 30, 1917, while the Consolidated Mining and Smelting Co.'s recently published annual report showed that at September 30, 1917, its issued capital was \$10,477,450, and that three dividends declared in 1917, prior to September 30, totalled \$784,317.50, so that there remained only the fourth quarter's dividend of \$261,936.25, payable January 1, to add,

253.75. Instead, therefore, of the two companies mentioned having been stated to have declared dividends in 1917 together totalling \$3,132,648, they should have been shown as having declared dividends totalling about \$2,545,500, or approximately \$587,000 less than shown in the official publication here referred to.

East Kootenay.

The Cranbrook Herald recently ridiculed a report to the effect that the American Smelting and Refining Company has decided to establish smelting works in East Kootenay. It is stated that the company is doing diamond-drilling on some mineral claims on North Star Hill, in Fort Steele mining division, which property it holds under option of purchase, but beyond that the big United States company is not spending money in East Kootenay at the present time.

Published official statistics place the coal production of the several collieries in the Crowsnest district of Southeast Kootenay for 1917 at 552,358 long tons of coal, as compared with 882,270 tons in 1916. The quantity used for coke-making was about 187,275 tons, and the output of coke was 129,155 tons, as compared with 240,121 tons in 1916.

Official comment follows: "The output would have been considerably greater had not the Crowsnest collieries met with a series of misfortunes during the year that interfered with production, and, in addition to this, there was a serious shortage of labor—partly caused by the heavy enlistment of the younger men—and in the Fall there were labor troubles."

The collieries that were operated were those of the Crow's Nest Pass Coal Company, at Coal Creek, and Michel, respectively, and the Corbin Coal and Coke Company, at Corbin.

West Kootenay.

Ainsworth.—There is a promise of more attention being given to mines in the Woodberry Creek region, in Ainsworth mining division, this year, than for several years past. Lacking even wagon-road transportation facilities, though, the properties up that creek are under a great disadvantage, since pack-horses have to be used for taking in supplies and bringing out ore, consequently development operations are much restricted.

Mr. A. R. Langley, resident engineer for Eastern Mineral Survey District No. 5, in his published official report, includes mention of the Manganese Group, as follows: "This property is owned by A. J. Curle, of Kaslo, and A. G. Larson, and is situated on the Kaslo & Nakusp railway, six miles and a half from Kaslo. Very little development and mining work have been done as yet. Some 600 sacks of ore are ready for shipment, and the owners claim that a considerable tonnage is available for extraction at low cost. Average assays run as follows: Manganese, 42.06 per cent.; iron, 1 per cent.; moisture, 13.12 per cent.; silica, 4 per cent.; phosphorus, 0.01 per cent. The limited exploratory work done would indicate that the ore occurs as a blanket deposit lying on or near the surface and having a thickness of from 1 to 3.5 feet. This property has possibilities and further work should be done to determine the extent and character of the deposit."

Slocan.—According to a published official bulletin, the Government resident engineer for the district in which this mining division is situated, has reported approximate shipments of ore and concentrates in 1917 from mines in the division as follows: Of ore: Lucky Thought 923 tons, Echo 79 tons, Queen Bess 2,225 tons.

164 tons. Of lead concentrates: Standard 5,200 tons, Galena Farm 1,307 tons, Van-Roi 1,739 tons, Hewitt 157 tons, Surprise 1,830 tons, Slocan Star 1,660 tons, Rambler-Caripoo 902 tons, Ivanhoe 770 tons. Of zinc concentrates: Standard 11,000 tons, Galena Farm 1,490 tons, Hewitt 200 tons, Surprise 2,523 tons, Slocan Star 800 tons, Lucky Jim 2,600 tons. In addition there were a number of mines that shipped smaller quantities of ore.

Nelson.—From Spokane, the headquarters of the managing director of the company owning the mine, has come information that mining operations have been resumed at the Hudson Bay zinc mine, situated a few miles from Salmo, in the southern part of Nelson mining division. An official report states that a considerable quantity of zinc ore was shipped from the mine in the first part of 1917, while the estimate of zinc in ore shipped is 1,800,000 lbs. In his published official report for 1916 the Gold Commissioner for the district gave the following particulars, which will serve to convey a fair idea of what earlier operations were: The H. B. Group is one of the most important groups of mines in the district. Production during eleven months of 1916 was: Zinc ore, 5,401 dry tons, yielding 2,910,675 lbs. of zinc; lead-zinc ore, 1,118 dry tons, yielding 461,980 lbs. of zinc and 182,322 lbs. of lead; total, 6,468 tons, yielding 3,372,665 lbs. of zinc and 182,322 lbs. of lead. Development work done in 1916 consisted of 1,906 feet of tunnel drift and 1,553 feet of diamond drilling. Average number of men employed, 40.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.

Feb. 13, 1918—Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 9 cents per lb.
Tin, 85 cents per lb.
Antimony, 17 cents per lb.
Copper, casting, 31 cents per lb.
Electrolytic, 32 cents per lb.
Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Feb. 13, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$9.85 per ton.
Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York cents.	London pence.
Jan. 22	87 $\frac{1}{2}$	43 $\frac{3}{4}$
Jan. 23	87 $\frac{1}{2}$	43 $\frac{3}{4}$
Jan. 24	87 $\frac{1}{2}$	43 $\frac{3}{4}$
Jan. 25	87 $\frac{1}{2}$	43 $\frac{3}{4}$
Jan. 29	87 $\frac{1}{2}$	43 $\frac{1}{2}$
Jan. 30	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Jan. 31	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 1	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 5	86 $\frac{5}{8}$	43 $\frac{1}{4}$
Feb. 6	86 $\frac{1}{2}$	43
Feb. 7	86 $\frac{1}{2}$	43
Feb. 8	86 $\frac{1}{2}$	43
Feb. 13	85 $\frac{5}{8}$	42 $\frac{3}{4}$

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Copper—

Prime Lake, 23.50.

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Lead, Trust price, 6.75.

Lead, outside, nominal, 7.00 to 7.12 $\frac{1}{2}$.

Spelter, prompt western shipment, 7.92 $\frac{1}{2}$.

Antimony—

Chinese and Japanese nominal, 14.00 to 14.25.

Aluminum—nominal.

No. 1 Virgin 98-99 per cent., 36.00 to 38.00.

Pure 98-99 per cent. remelt, 34.00 to 36.00.

No. 12 alloy remelt, 27.00 to 29.00.

Powdered aluminum, 75.00 to 85.00.

Metallic Magnesium—99 per cent. plus \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$125.00.

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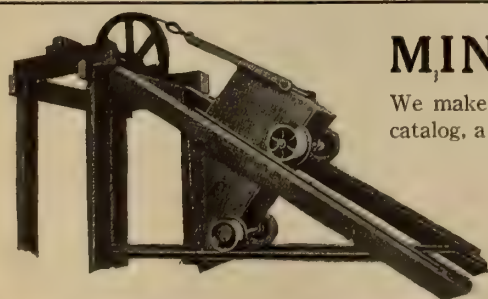
10 per cent. Iridium, \$113.00.

Cobalt (metallic) \$3.25 to \$3.50.

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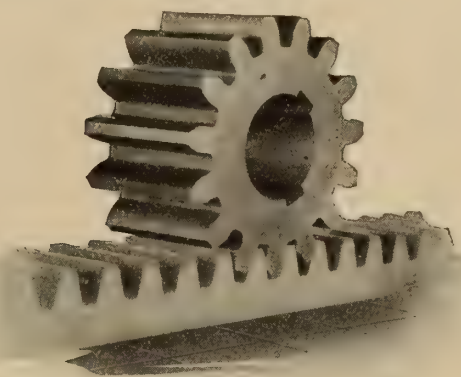
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Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium petroleum, platinum, quartz, salt and tale.

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Ontario in 1916 produced 45 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1916 to be worth \$65,303,822, of which the metallic production was \$55,002,918.

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Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wildon, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of the Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memor 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memor 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memor 95. Onaping Map-Area, by W. H. Collins.
- Memor 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memor 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memor 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memor 99. Road material surveys in 1915, by L. Reinecke.
- Memor 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memor 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

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- Amalgamators—**
Northern Canada Supply Co.
- Antimony—**
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- Assayers and Chemists—**
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Campbell & Deyell, Cobalt.
Ledoux & Co., 99 John St.,
New York.
Thos. Heys & Son.
C. L. Constant Co.
Koering Cyaniding Process
Company.
- Assayers' and Chemists Sup-
plies—**
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liam St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley, W. F. & Co., Ltd.
Koering Cyaniding Process
Company.
- Babbitt Metals—**
Canada Metal Co., Ltd.
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Can. Fairbanks-Morse Co.
Hoyt Metal Co.
- Ball Mills—**
Hull Iron & Steel Foundries,
Ltd.
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Cotton—**
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plies—**
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Northern Canada Supply Co.
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Northern Canada Supply Co.
Standard Underground Cable
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- Cableways—**
M. Beatty & Sons, Ltd.
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- Cages—**
Northern Canada Supply Co.
- Cables—Wire—**
Standard Underground Cable
Co. of Canada, Ltd.
- Car Dumps—**
Sullivan Machinery Co.
- Cars—**
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Northern Canada Supply Co.
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- Car Wheels and Axles—**
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- Cement Machinery—**
Northern Canada Supply Co.
Hull Iron & Steel Foundries,
Ltd.
Can. Allis-Chalmers, Ltd.
- Chains—**
Can. Fairbanks-Morse Co.
Jones & Glassco.
Northern Canada Supply Co.
- Chemists—**
Canadian Laboratories.
Campbell & Deyell.
Thos. Heys & Sons.
- Milton Hersey Co.**
Ledoux & Co.
- Coal—**
Dominion Coal Co.
Nova Scotia Steel & Coal Co.
- Coal Cutters—**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
Ltd., Montreal, Que.
- Coal Mining Explosives—**
Curtis & Harvey (Can.),
Ltd.
Canadian Explosives, Ltd.
- Coal Mining Machinery—**
Canadian Ingersoll-Rand Co.
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Sullivan Machinery Co.
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- Pig Tin—**
Canada Metal Co., Ltd.
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		Steel Drums — Smart-Turner Machine Co.	Wire (Bare and Insulated) — Standard Underground Cable Co., of Canada, Ltd.
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No. 5



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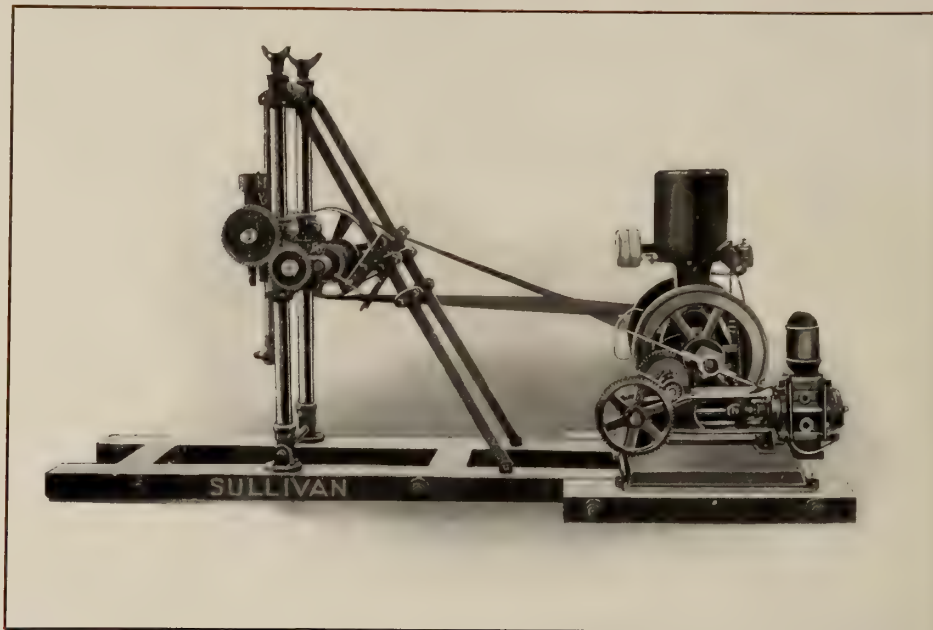
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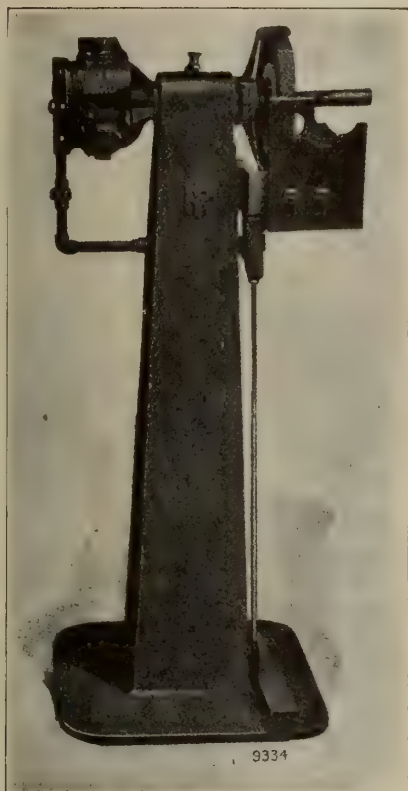
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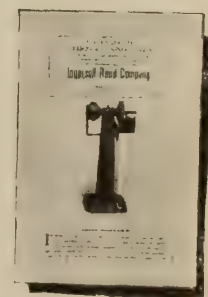
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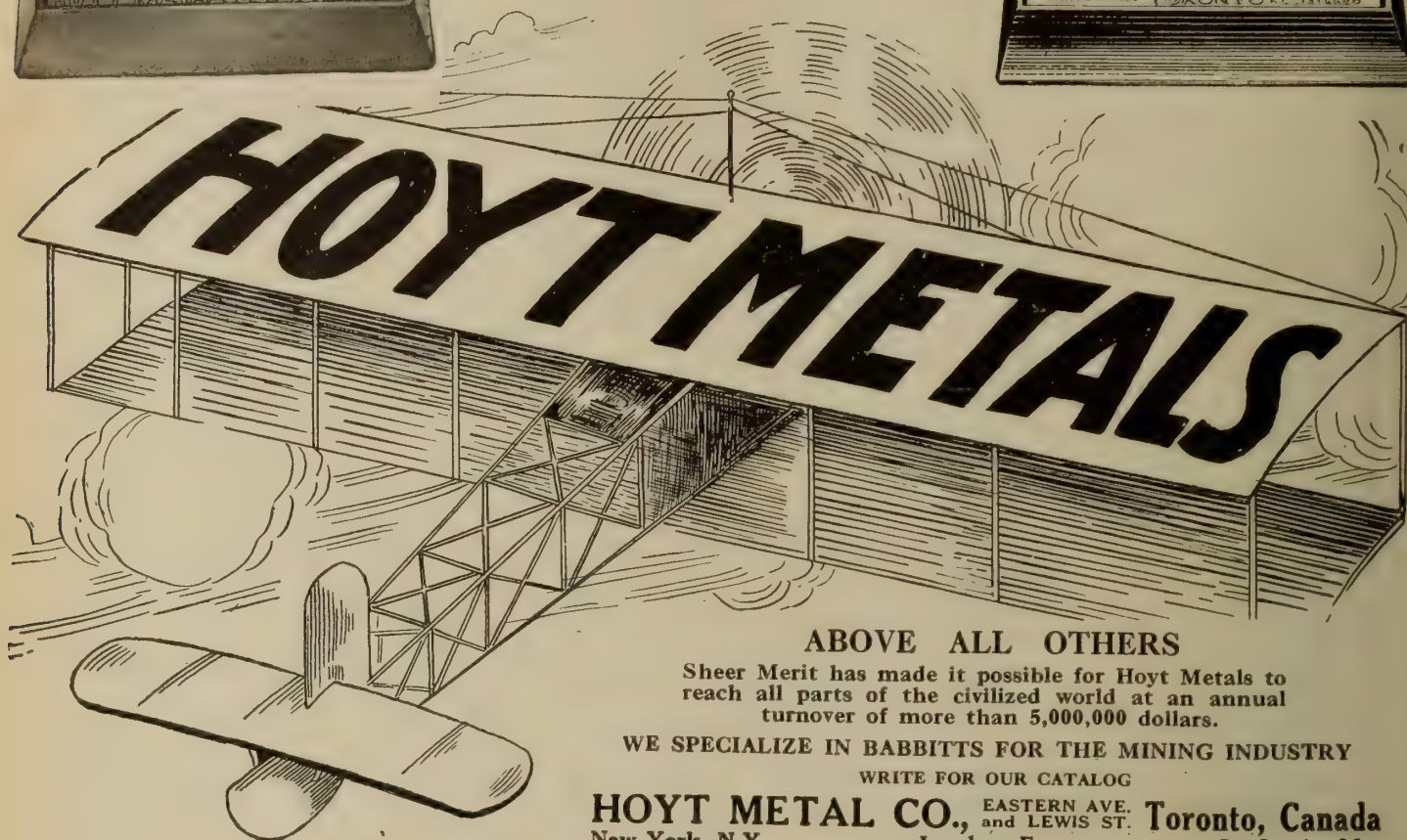


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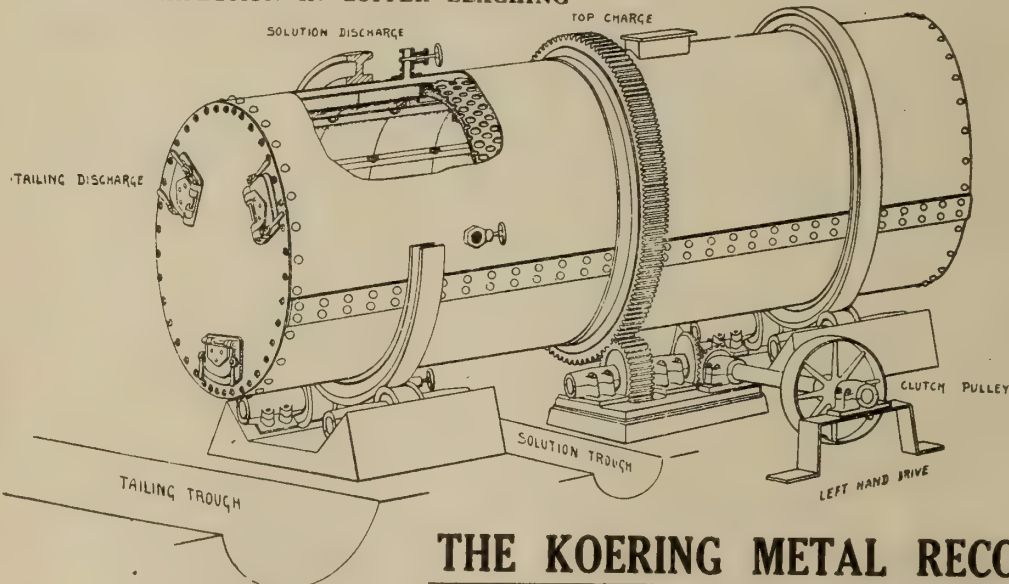
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View showing R. c. and P. c. c. from Bayhead

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To prevent this condition, the motor is ground, starting with the series of the end and parallel bases are covered by a middle ground. Further, the protruding end of the rack gear is not allowed to move, so that by the possibility of the motor injured or destroyed the operation.

Standard Equipment

3. The standard equipment consists of a two-line sample α with pushing pin β' and meter for β' (see a 2nd fig.) and the remainder of the pin being α'' (character two) which is automatic lubricator (an extension β'' pipe to which the air hose is attached) to force not only the air hose (this extra

4 00 lbs
22" x 14"
17"
6"
1"
5.0 1.0 1.00 lbs

The Leyner Shank & Bit Punch

Punches either shanks or bits. It is quick in action. Handles all sizes of drill steel. One lever controls all operations. Air consumption low.

The Leyrer Sharpener makes and sharpens the drill bits and shank, the Shank and Bit Punch will keep the holes open in hollow drill steel, and the Grinder will square up the drill

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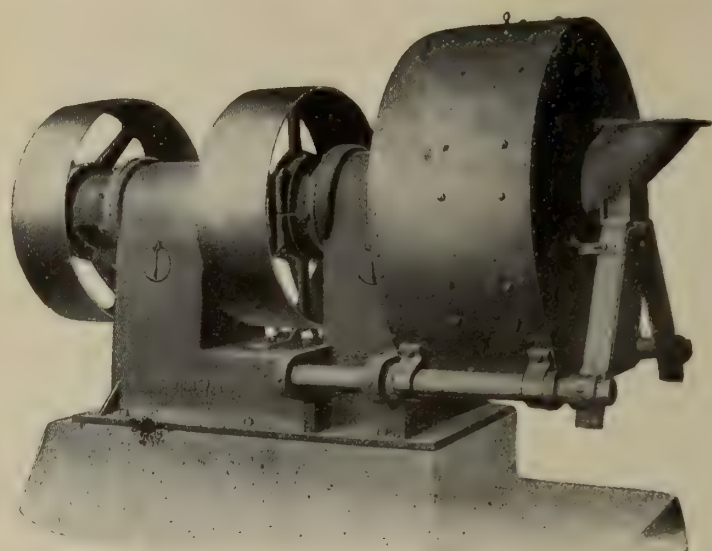
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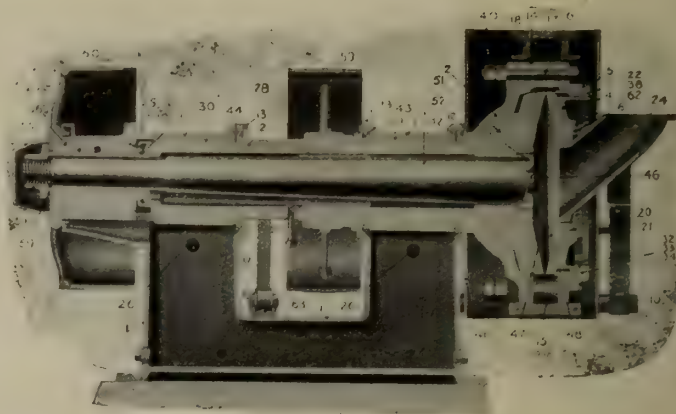
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We will offer specially attractive prices on the 36-inch Disc Crushers, in order to move this stock. This is a rare opportunity to buy a Disc Crusher at a Bargain.



The Disc Crusher Principle

The crushing is done between two discs of manganese steel. Fig. 2950 shows the discs in proper position. Fig. 2949 shows them in cross-section. They are dish-shaped and are set with their hollow or concave sides facing each other, forming a cavity between them.

These discs both rotate in the same direction at the same speed. The discs are supported at an angle to each other. This provides a wider opening between the edges of the discs at one part of their circumference than at the opposite part.

When stone is fed through the central feed opening it is thrown by centrifugal force, into the opening where the discs are widest apart. It is carried around with them to where they are closer together and is crushed in the operation. The smaller particles fly out from between the discs, into the encircling chute, while the larger particles are caught again and the operation repeated.



Fig. 2949 Fig. 2950

The 36 inch Symons Disc will take 5-inch ore or stone and reduce it to $\frac{3}{4}$ inch at one operation.

DAILY CAPACITIES

250	Tons to	$\frac{3}{4}$ inch
400	"	" 1 "
500	"	" $1\frac{1}{2}$ "
600	"	" 2 "

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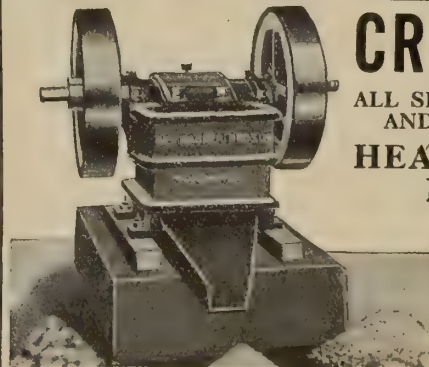
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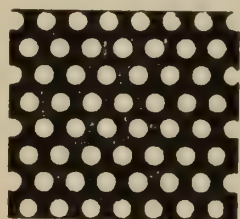
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The Minerals of Nova Scotia

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Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

Coal Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

HON. E. H. ARMSTRONG, - Halifax, N. S.

Commissioner of Public Works and Mines



PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORÉ MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167 603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with mining Reports and Maps, may be obtained gratis by addressing

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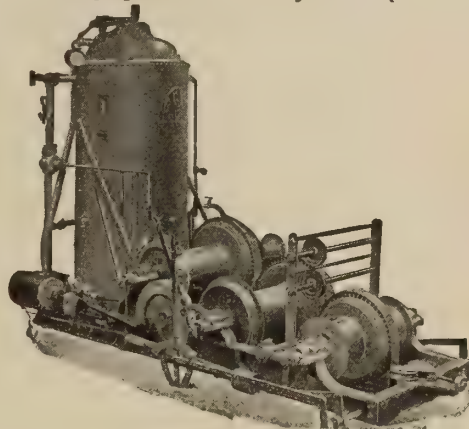
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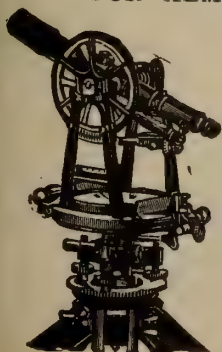
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THE CANADIAN MINING JOURNAL

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The shortage of coal has directed a great deal of attention to the necessity of more fully utilizing inferior fuels. This should be done, as far as possible, without delay; but even greater attention should be given to means for more fully utilizing, especially during the war, the best grades of coal. Nova Scotia has splendid coal that should be more extensively used in Eastern Canada and the North Eastern States. Alberta and British Columbia coal mines can supply excellent coal for Western Canada and the North Western States. Ontario should get most of its coal from the nearby mines in the United States. This is no time to attempt to supply all Canada with Canadian fuel. The best interests of Canada and the United States demand more complete utilization of the best grades of coal near the points of production, regardless of the boundary line.

The annual meeting of the Canadian Mining Institute will be held at the Windsor Hotel, in Montreal, on March 6th, 7th and 8th.

Control of metals after the war is a matter that must receive careful attention. Before the war, Germany had acquired control of a very considerable portion of the metals used in Europe in addition to the needs of Germany itself. German metal merchants secured control of metals, ores and concentrates produced in various parts of the world, and so Germany was in an admirable position to secure what seemed to be ample stocks before declaring war. Fortunately, she failed to secure a sufficient supply of such metals as copper and nickel for such a war as this has become. We should see to it that, so far as we are able, Germany never again secures more Canadian metals than enough to supply her ordinary needs for peaceful pursuits.

Germany was for years a storehouse of metals gathered from all parts of the world, ready for war and controlling the market, so that German metal dealers could secure handsome profits on practically all the metals imported by European countries. The surplus stock was sold at prices fixed by the Germans, and an ample, or what was believed to be ample, supply for war purposes was always in their control. Thus they carried on a lucrative business, provided for their needs for industrial purposes and their supposed needs for war purposes and worked against the natural development of metal industries in other countries.

A merger of the Dominion Steel Corporation and the Nova Scotia Steel and Coal Company has been frequently talked of, and now seems likely to be accomplished. The officials concerned have not given out information which would indicate that the two companies have finally joined forces; but their replies to queries indicate that negotiations are well advanced.

As these two companies produce four-fifths of Eastern Canada's coal and nearly all the iron and steel of the Maritime Provinces, the merger is one of unusual importance. If it is accomplished, we may soon expect to see Nova Scotia take a much more prominent place in the industrial world. Already the Eastern Province has an enviable position as a producer of coal, iron and steel, and has played a big part in supplying these necessities; but there remains to be developed a host of subsidiary enterprises.

A greater variety of iron and steel products than is now obtainable in Canada will probably be one of the results of a merger of the two Nova Scotia companies. This will naturally be followed by the establishment in Nova Scotia of many manufacturing plants.

MEMORANDUM.

Re Mining Industry submitted by a Deputation representing the Canadian Mining Institute.

Feb. 8, 1918.

To the Right Hon. Sir Robert Borden, P.C., G.C.M.G., K.C., LL.D., Prime Minister of Canada,

The Council of the Canadian Mining Institute desires to present for your consideration the following matters directly connected with the Mining Industry, and which, it is believed, will be of material aid to the Dominion, not only in this time of its stress and burden, but also in the immediate future when the burdens of reconstruction and recuperation will bear heavily upon the Government and the people of this Dominion.

We realize that the great importance of increasing sources of revenue, and the need for the exercise of the strictest economy in the expenditures of the administrative departments is fully appreciated by your Government. It is believed that, of all Canadian industries, that of mining possesses the greatest possibilities for profitable expansion, inasmuch as no established business is entirely independent of the mineral industry or its products. Therefore, it is manifest that measures having for their object the stimulation of discovery and effective exploitation of Canadian mineral resources, should have your Government's immediate attention and be made rapidly effective, since effectiveness in this direction depends, to a very large degree, upon the policy and assistance extended by Government.

It is our opinion that this assistance can be best given through the Department of Mines, to which Department the task should be entrusted, and we also respectfully submit that much of the past and present dissipation of funds and energy can be avoided through non-duplication of effort by different branches of the Civil Service and Commissions. In the immediate past identical information has been sought through at least three different bureaus, two of which were not correlated with the Department of Mines. A unification of all such efforts through a recognized and extended Department of Mines is, therefore, greatly to be sought, and can unquestionably be obtained if your Government so desires. It is earnestly hoped that your Government may seriously consider the information which accompanies this request.

Strengthening of the Department of Mines: From the year 1841 to 1907 the Geological Survey of Canada carried on exclusively the obtaining of information respecting the mineral resources of Canada. Under a Minister of the Crown, and more directly under an officer known as the Director of the Geological Survey, excellent work was accomplished and a permanent record made.

In the year 1907 by 6 and 7 Edward VII, Chapter 29, "The Geology and Mines Act" was passed, whereby the Department of Mines was created and placed under the administration of a Minister who was also the head of another Department of the Government of Canada. Provision was thereby made, and, it is believed, erroneously made, for the division of the Department into two branches, one called "The Mines Branch," and the other called "The Geological Survey."

By Section 6 of the said Statute, the functions of the Mines Branch are:—

(a) To collect and publish full statistics of the mineral production and of the mining and metallurgical industries of Canada, and such data regarding the economic minerals of Canada as relate to the processes and activities connected with their utilization, and to collect and preserve all available records of mines and mining works in Canada;

(b) To make detailed investigations of mining camps and areas containing economic minerals or deposits of other economic substances, for the purpose of determining the mode of occurrence, and the extent and character of the ore-bodies and deposits of the economic minerals or other economic substances;

(c) To prepare and publish such maps, plans, sections, diagrams, drawings and illustrations as are necessary to elucidate the reports issued by the Mines Branch;

(d) To make such chemical, mechanical and metallurgical investigations as are found expedient to aid the mining and metallurgical industry of Canada;

(e) To collect and prepare for exhibition in the Museum, specimens of the different ores and associated rocks and minerals of Canada, and such other materials as are necessary to afford an accurate exhibit of the mining and metallurgical resources and industries of Canada.

By Section 7, the functions of the Geological Survey are:—

(a) To make a full and scientific examination and survey of the geological structure and mineralogy of Canada; to collect, classify and arrange for exhibition in the Victoria Memorial Museum such specimens as are necessary to afford a complete and exact knowledge of the geology, mineralogy, palaeontology, ethnology, and fauna and flora of Canada, and to make such chemical and other researches as will best tend to ensure the carrying into effect the objects and purposes of this Act;

(b) To study and report upon the facts relating to water supply for irrigation and for domestic purposes, and to collect and preserve all available records of artesian or other wells;

(c) To map the forest areas of Canada, and to make and report upon investigations useful to the preservation of the forest resources of Canada;

(d) To prepare and publish such maps, plans, sections, diagrams and drawings as are necessary to illustrate and elucidate the reports of surveys and investigations;

(e) To carry on ethnological and palaeontological investigations.

It is interesting to note that by Section 4 of the Statute it was contemplated that there should be transferred to this Department for consideration and action, all related subjects from other Departments, with the object, apparently, of entrusting to the Department of Mines all that it was possible to assign to it within the terms of its functions. So much was this the case that by Section 21, the forestry resources of the Dominion were referred to this Department to be dealt with in the following manner:—

The Minister may, for the purpose of obtaining a basis for the representation of the mineral, mining and forestry resources, and of the geological features of any part of Canada, cause such measurements, observations, investigations and physiographic, explanatory and reconnaissance surveys to be made as are necessary for or in connection with the preparation of mining, geological and forestry maps, sketches, plans, sections or diagrams.

The reason why it is believed that the division of the functions of the Department of Mines, as by the Statute provided, is erroneous, is that in practice it has led to overlapping, to divided authority, and to friction arising out of sectional jealousies.

No Real Minister of Mines.

Probably the reason for these difficulties has been, as much as for any other, that the Minister has never been charged with the sole purpose of attending to the mining industry, has always had other manifold duties to perform, and has never been long enough in office to enable a continuity of policy, such as should have existed in respect to so important a subject.

It is enough to recall to your attention in this connection that there have been, in the last six years, no less than eight Ministers or Acting Ministers of Mines.

We are firmly convinced that if a Minister of Mines charged solely with the work of this Department were to give his undivided attention to it, much that has occurred would have been avoided, and will be avoided in the future.

The Conservation Commission.

The scope of the work of the Department of Mines is wide; but instead of encouraging the Department to fully perform its duty, from time to time, Commissions—some Statutory, some appointed by Order-in-Council, and some more or less self-appointed—have encroached upon the domain of the Department of Mines, have been encouraged by the Government of the day in so doing, have been granted sums of money to spend upon subjects and matters that should properly have been dealt with by the Department of Mines, but for which that Department could never obtain the necessary funds.

The first apparent inroad was made by the Government in the year 1909, when it passed an Act Respecting the Commission of Conservation, 8 and 9 Edward VII, Chapter 27. By Section 10 of that Statute, it is provided that:—

It shall be the duty of the Commission to take into consideration all questions which may be brought to its notice relating to the conservation and better utilization of the natural resources of Canada, to make such inventories, collect and disseminate such information, conduct such investigations, inside and outside of Canada, and frame such recommendations as seem conducive to the accomplishment of that end.

By Section 12, it is provided that no permanent officer or employee shall be appointed by the Commission. This was a modest programme. By 3 and 4 George V, Chapter 12, Section 1, all this was changed. We beg to refer you to a publication entitled "Catalogue of Publications revised to December 1st, 1913," and published by the Commission of Conservation of Canada, at page 27, and the annual reports since that date, and ask you to consider to what extent the work undertaken by the Commission might have been done by the Department of Mines.

We beg to call your attention, also, to the tendency to duplicate work rightfully belonging to the Department of Mines, evidenced by some of the publications of the Natural Resources Division of the Department of the Interior, and the Mines Branch of that Department.

The Munition Resources Commission.

A later encroachment, but by no means the least, upon the domain of the Department of Mines, was the appointment, since the outbreak of the war, of a Munitions Resources Commission, whose function it was, and is, to advise the Imperial Munitions Board on the available Canadian minerals for use for war purposes. There had previously been in existence a Shell Committee. This was disbanded and members of it were reappointed as the Munition Resources Commission, with the addition of one member from the Department of Mines, for the same purpose as mentioned.

We are of the opinion, and very firmly of the opinion, that the duties of this Commission, for which duties the Department of Mines was created and is essentially suitable, could have been well performed by that Department, with the co-operation of the Canadian Mining Institute and the Provincial Departments of Mines.

Dissemination of Energy Leads to Useless Waste.

All this dissemination of work and effort, this duplication of work, and misplacement of confidence, leads to large expense, useless extravagance and waste, and a destruction of the virtue, opportunity and effectiveness of a Department long in the field, well equipped and capable of doing the work that is being taken away from it. One can, of course, destroy the efficiency and reputation of any Department of the Government by robbing it of its duties, and having them performed by others supplied with moneys which should have been voted to the Department thus impaired. Every branch of mining, everything pertaining to minerals, all laboratory and technical work, and all research in respect to these matters, should be committed to the various divisions of the Department of Mines, each presided over by a qualified technologist. The Department is well equipped with laboratories, which could be enlarged as necessity demands.

National Importance of Mining:—In 1915, the mining, smelting, and related industries of Canada employed 104,425 men and yielded products of a value of \$265,046,000. In addition, and directly following this production, 50,393 men were employed in further manufacturing these products, giving to them an added value of \$103,912,000. That is to say, of a total of 2,723,000 wage-earners in Canada, one-ninth are employed in the mining and dependent industries.

As a further indication of the importance of the mineral industry from the national standpoint, it may be noted that, in 1915, the tonnage supplied to railways by the different industries was:

Products of mines	37.89%
Products of agriculture	18.79%
Products of forest	16.03%
Manufactures	14.76%

Raw Materials Should Be More Largely Utilized in Canada.

Whilst the imports of crude mineral products are only slightly in excess of a similar grade of exports, it is noted that a great quantity of manufactured products is imported; and much exported in a raw stage that should be more highly finished in Canada. That is to say, not only are we re-purchasing materials manufactured from our own exports, but are not obtaining the greatest return from what we do sell as a surplus above our requirements, e.g., asbestos, magnesite, nickel, copper, zinc. It is felt that by a more vigorous policy, the Department of Mines, by studying more intensively the preparation of raw materials, the need of consumers and possibilities of expanding consumption, could greatly stimulate and assist in having our raw materials marketed and exported in a more highly finished form with a consequent greatly enhanced return to the producer. For instance, at present most of our asbestos is exported in the raw state. Whilst the lower grades which go into heavier products will probably always have to be manufactured near the point of consumption, yet it would seem that the higher grades might be manufactured equally well in Canada, and to the great advantage of the country. The need for close co-operation between Canada and other parts of the Empire to insure that the metal requirements of the Empire, for both war and peace, be made from the joint resources, is now realized.

Trade After the War:—The Right Honorable Lloyd George, in recently proposing his peace terms before the Trades and Labor Council of Great Britain, said:

"Economical conditions at the end of the war will be in the highest degree difficult, owing to the diversion of human effort to war-like pursuits. There must follow a shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves, and their friends first. Apart from this, whatever settlement is made, will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for."

Alfred Ballin, organizer and administrator of the German shipping trust, in a recent letter to Dr. Ratheman, of Berlin, remarked as follows: "You do not believe in the silly assertion that after the war these British markets for raw materials will be open to us? What a prospect? Out of the British Empire are produced countless articles on which we have hitherto relied and which will be indispensable in the future if we are to swim and not to sink."

These quotations indicate why Canada should be ready after the war with all the raw materials that she possesses, not only for the use of the Empire and for export, but more essentially to manufacture them as far as practicable within the confines of the Dominion.

The control of the Canadian metal trade, as far as possible, should be in our own hands. When one reads the report of the Federal Trade Commission of the United States for 1916, on "Co-operation in American Export Trade," there is ground for alarm at the growth shown of outside influence in metal control before the war. There should undoubtedly be co-operation between Canada and other parts of the Empire to insure that the metal requirements of the Empire for both war and peace, be made from the joint resources; and, in this connection the Department of Mines should concern itself more directly with promoting commercial interests in connection with mining. Invaluable work has been done in the past, mainly in the study of resources; but the information in respect of resources should be correlated with that relating to trade, and in general all matters pertaining to the welfare, development and progress of mining, should be made the business of the Department. For the proper performance of this function it is essential that the two branches of the Department, as at present constituted, should be united.

Stimulation of Exploration for Minerals:—It is probably no exaggeration to state that two-thirds of the total area of Canada represents waste land which can never be of value unless it shall prove to be mineral-bearing. In Eastern Canada is a vast region comprising 1,800,000 square miles, underlain by rocks of pre-Cambrian age. In this pre-Cambrian region, where it extends into the States of Minnesota, Michigan, and Wisconsin have been found the immensely valuable copper deposits of Michigan, and the great iron ranges which have made the United States the foremost producing country of iron ore in the world. Along the thin line of settlement in Ontario, in the Canadian pre-Cambrian, exploration has resulted in the development of the greatest nickel-producing mines in the world, and two other uniquely rich mineral producing areas, namely, those of Cobalt and Porcupine. Recently, in the pre-Cambrian of Manitoba and Saskatchewan, exceedingly promising mineral discoveries have been made, and are being developed. As yet, however, a very small portion of this potentially rich mineral area has been systematically explored and

prospected, and every possible endeavor, therefore, should be made to facilitate and encourage endeavor in this direction. Incidentally it may be pointed out that much may be expected from thorough exploration of those sections of the country, underlain by pre-Cambrian rocks, that will become accessible upon the completion and operation of the new railway to Hudson's Bay. The establishment of a successful mining industry in this northern field would, moreover, contribute very materially to the profitable operation of the railway.

In the West, through British Columbia and northward into the Yukon, is the extension of the Cordillera Mountain system, which in Mexico and the United States has, it is estimated, produced minerals to the value of over \$3,500,000 for each mile in length of these mountains. Within Canadian territory the mountains comprising this system have an approximate length of 1,600 miles, by an average breadth of from 500 to 800 miles. Here, also, exploration has been of a very restricted character. These statements sufficiently indicate the opportunities that exist for mineral exploration in Canada, and the desirability of devoting special attention to the problem of inducing it. In this connection the practicability of training returned soldiers to become explorers, and of offering them certain inducements or incitements to adopt this calling, might be considered.

A Mines Act:—In order to encourage prospecting on Crown lands, under Federal control, it is essential that the provisions governing the securing of title should be of a satisfactory and permanent character. The Regulations in respect of tenure to mining lands have hitherto been established by Order-in-Council, and being subject to amendment under conditions that do not permit of the public being fully advised of such change, are detrimental because of their instability and of the uncertainty thereby occasioned. The Canadian Mining Institute has urged repeatedly upon the Government the wisdom of withdrawing the Orders-in-Council relating to mining, and substituting therefor laws in the form of a Statute. In 1910 the Minister of Mines charged the Institute with the preparation of such a Statute. It entered upon the task with diligence and care, and produced what, it is believed, embodies the desires of those engaged in mining in Canada. The result was printed and circulated by the Government, but has never been presented to the House. There were two sources of objection to its presentation—one the Department of the Interior, from which it would remove the disposition of mining lands, and the other, the member for the Yukon, who disagreed with that portion of the Bill applicable to placer mining in the Yukon. May we be permitted to again strongly urge upon the Government the desirability of bringing this Mines Act into effect.

We confidently believe that if careful consideration be given to the above representations, and remedies are provided along the lines suggested, there will result very great immediate economies to the State; very considerable additions to the efficiency of the Department of Mines; very large economical and financial gain to the Dominion of Canada at a time when this country needs every source of revenue from raw materials to the very limit of possibility. In our humble opinion, there is nothing that will increase the revenue of Canada more substantially than procedure of the Government along the lines above indicated.

All of which is respectfully submitted on behalf of the Council of the Canadian Mining Institute.

Preliminary Report on Production in 1917

By John McLeish.

It is customary to express the total mineral production and to make comparison of production in different years in terms of dollars, or total values.

On this basis of record and comparison the total value* of the metal and mineral production in 1917, as shown in this Preliminary Report, was \$192,982,837. Compared with a production in 1916 valued at \$177,201,534, an increase of \$15,781,303, or 8.9 per cent., is shown, while compared with a production in 1915, valued at \$137,109,171, there is shown an increase of \$55,873,666, or 40.8 per cent.

It must not be inferred, however, that because such a large increase is shown in the value of our mineral production, that our mines and quarries have actually increased their tonnage output at the same average rate. In fact, an examination of the record will show that the quantities of many important products were considerably less in 1917 than in 1916, and over two-thirds of the increase in value is to be attributed to coal, gypsum and cement, in which the quantities marketed were less than in the previous year.

The interrelation of industry is shown by the effect of a diminished coal and coke output on the metallurgical production, the falling off in production of copper and gold is in part attributable to this cause. Lead and silver also show much smaller output. As against these decreases there has been an important increase in the production of zinc and increases also in the production of cobalt, molybdenite and nickel.

In 1916 the metal production showed a very large increase over that of the previous year, but in 1917 the net result in value has been an increase of only \$311,387, making a total value of \$106,630,752.

The total value of the non-metallic production, including clay and quarry products, in 1917, was \$86,352,085, as compared with \$70,882,169 in 1916, showing an average increase of \$15,469,916, or 26 per cent. Practically every product, with the exception of the stone quarry output, shows an increased value of production; but in the case of coal, graphite, gypsum and cement, the quantities actually marketed were less, notwithstanding the increased values.

Copper.

The production of copper in 1917 amounted to 108,860,358 pounds valued at \$29,588,254 as against 117,150,028 pounds valued at \$31,867,150 in 1916, a decrease of 7.08 per cent. in quantity and 7.15 per cent. in value. Though less than the previous year the 1917 production was greater than any other previous record. In 1916 the increase over the production of 1915 had been 16.2 per cent. in quantity and 83.0 per cent. in value.

The electrolytic copper refinery installed at Trail, B.C., began operations about November 1st, 1916, with

a capacity of 10 tons of refined copper per day, which has been increased to 20 tons per day.

Of the total 1917 production 86,508,758 pounds was contained in blister copper and in matte produced in Canada and 22,351,600 pounds estimated as recovered from ores exported.

In addition to the recoveries from domestic ores there were also recovered in British Columbia smelters 5,033,630 pounds of copper from imported ores.

The production in Quebec from pyrite ores was 5,013,560 pounds valued at \$1,362,636 as against 5,703,347 pounds valued at \$1,551,424 in 1916. These are the quantities reported as being paid for; the actual metal contents were much higher.

The Ontario production is derived chiefly from the nickel-copper ores of the Sudbury district and of the Alexo mine in Temiskaming supplemented by a small recovery from the Cobalt district silver ores and by shipments made from a few copper properties under development. The total production in 1917 amounted to 42,796,213 pounds valued at \$11,632,014 as against 44,997,035 pounds valued at \$12,240,094 in 1916, a decrease of 4.0 per cent. in quantity.

There was an important copper production in Manitoba in 1917 derived from the ore deposits at Schist Lake north-west of the Pas, operated by the Mandy Mining Company. These sulphide ores as well as those at Flin Flon Lake in the same district have had a very large amount of development work expended upon them during the past two years. The ore shipments which amounted to 3,388 tons were made under great difficulty of transportation having been hauled 40 miles by sleigh in winter and then 190 miles by barge during summer and then 1,500 miles by rail to the smelter at Trail.

The British Columbia production was 57,717,535 pounds valued at \$15,687,631, as against 63,642,550 pounds valued at \$17,312,046 in 1916—a decrease in quantity of over 9 per cent.

The production included 40,720,413 pounds recovered in blister and matte and 16,997,122 pounds being the estimated recovery from ores shipped to United States smelters.

The production from the Yukon in 1917 amounted to 2,182,050 pounds valued at \$593,081, as against 2,807,096 pounds valued at \$763,586 in 1915. The production is derived from the mines of the Whitehorse district in southern Yukon.

Prices:—The New York price of electrolytic copper, which was 28¾ cents early in 1917, increased to a maximum of 32 cents towards the middle of February though small lots sold as high as 34 cents. Then there was a gradual falling off till it reached 24½ in July. The price remained uncertain until October, when the United States War Industries Board fixed, by agreement with the copper producers, the price at 23½ cents which remained the price for the last quarter of 1917.

*In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals copper, gold, lead, nickel, silver, and zinc is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

The Mineral Production of Canada in 1917.

(Subject to revision).

Metallic	Quantity	Value
Antimony, ore (exports)	*Tons. 774	\$ 50,476
Cobalt, metallic contained in oxide, etc.	Lbs. 1,089,134	1,742,614
Copper, value at 27.180 cents per lb.	" 108,860,358	29,588,254
Gold	Ozs. 747,366	15,449,426
Iron, pig from Canadian ore ..	Tons. 46,022	768,783
Iron ore sold for export.	" 169,192	590,336
Lead, value at 11.137 cents per lb.	Lbs. 32,072,269	3,571,889
Molybdenite MoS ₂ , contents at \$1.00 per lb.) ..	" 271,530	271,530
Nickel, value at 40 cents per lb.	" 84,470,970	33,778,388
Platinum	Ozs. 49½	5,090
Silver, value at \$1.4117 cents per oz.	" 22,150,680	18,034,419
Zinc, value at 8.901 cents per lb.	Lbs. 31,227,351	2,779,547
Total		106,630,752
Non-Metallic	Quantity	Value
Actinolite	Tons. 120	\$ 1,320
Arsenic, white and arsenic in ore	" "	709,937
Asbestos	" 134,322	6,942,410
Asbestic	" 9,596	18,688
Barytes	" 958	(b) 16,000
Chromite (a)	" 36,352	490,001
Coal	" 14,015,588	47,643,646
Corundum	" 188	32,153
Feldspar, (not complete)	" 11,493	54,555
Fluorspar	" 4,249	68,756
Graphite	" 3,714	402,892
Grindstones	" 2,279	44,037
Gypsum	" 339,418	887,170
Magnesite	" 58,090	728,275
Manganese	" 153	14,836
Mica	" "	350,732
Mineral pigments; iron oxides.	" 9,372	81,685
Mineral water	" "	145,276
Natural gas	M. cu. ft. 26,465,686	5,003,342
Petroleum	Brls. 205,332	478,937
Pyrites	Tons. 403,243	1,586,091
Quartz	" 205,851	440,444
Salt	" 138,909	1,047,792
Talc	" 15,812	76,539
Total		67,249,514
Structural Materials and Clay Products	Quantity	Value
Cement, Portland	Brls. 4,768,488	\$ 7,699,521
Clay products: \$4,603,755		
Brick: Common		2,017,046
Pressed and paving		589,406
Kaolin	Tons. 533	9,594
Pottery		122,878
Refractories: Fireclay, fire-brick, etc.		210,838
Sewerpipe		778,159
Tile		434,465
All other: Fireproofing hollow blocks, etc.		441,369
Lime	Bush. 6,338,212	1,517,913
Sand and Gravel	Tons. 7,157,279	1,908,773
Sand-lime brick	No. 12,432,990	143,393
Slate	Sq. 1,422	7,789
Stone:—\$3,221,422		
Granite		613,588
Limestone		2,291,692
Marble		55,820
Sandstone		260,322
Total structural materials and clay products.		19,102,571
All other Non-metallic		67,249,514
Total value Metallic		106,630,752

Grand Total, 1917

* Tons of 2,000 lbs. \$192,982,837

(a) Shipments by mine operators. The final shipments of ores and concentrates (including customs mill shipments) were 23,327 short tons valued at \$572,115 and containing 8,465 tons of Cr₂O₃.

(b) Owing to delay in receipt of returns, the value of the production of barytes and the value of part of the production of asbestos is not included in the total value.

Gold.

The total production of gold in placer and mill bullion and in smelter production in 1917, is estimated at 747,366 fine ounces valued at \$15,449,426 as compared with 930,492 fine ounces valued at \$19,234,976 in 1917, a decrease of \$3,785,550, or 19.68 per cent. This has been the lowest since 1912 when the new Porcupine field caused a considerable increase in Canada's production of gold.

The 1916 production had been the largest since 1902 when the Yukon output began to decline. The maximum production recorded was \$27,908,153 in 1900 and the lowest since that year was \$8,382,780 in 1907.

Of the total production in 1917, \$4,199,563, or 27.5

per cent. were derived from placer and alluvial mining; \$9,433,033, or 61.0 per cent. in bullion and refined gold; and \$1,816,827 or 11.5 per cent. contained in matte, blister copper, residues and ores exported.

The production in Nova Scotia was only \$45,478 in 1917, about equal to that of 1913, which was the lowest ever recorded and showed a decrease of over 51 per cent. from that of 1916. The decrease is mostly attributed to the great increase in cost for labour and material.

The production in Quebec is made partly from the pyrites ores of the Eastern Townships and partly from the zinc-lead ores of Notre Dame des Ange, Portneuf county. Much of this gold is not paid for by the smelters.

The Ontario production of gold was \$8,916,113 being about 58 per cent. of the total production for Canada and though it shows a decrease of 12 per cent. from that of 1916, it was the second highest ever recorded.

The production from Manitoba \$9,137 though small, points to the possibility of this province becoming an important producer. The gold was derived from the gold and copper ores of Herb and Schist lakes of the new Pas mining division in northern Manitoba.

The production in British Columbia in 1917 was \$2,776,558, a decrease of nearly 39 per cent. which was due not only to the high cost of supplies but also in part to labour troubles in that province and the closing down for several months of the Rossland mines which contribute largely to the output of gold.

The production from the Yukon Territory amounted to \$3,671,008, or a decrease of over 16 per cent., and included in addition to the alluvial gold, a small recovery from the gold and copper ores of the Whitehorse district and the gold-silver-lead ore of the Mayo district.

The exports of gold bullion, gold bearing dust, nuggets, gold in ore, etc., in 1917 are reported by the Customs Department as \$15,929,051.

Lead.

The earlier estimates of the production of lead in 1917 included the recoveries of considerable quantities of lead from imported ores. The total production in 1917 of lead in bullion credited to Canadian mines together with the lead estimated as recoverable from ores exported was 32,072,269 pounds, which, at the average price of lead in Montreal, 11.137 cents per pound, would be worth \$3,571,889. The corresponding production in 1916 was 41,497,615 pounds, valued at \$3,532,692, an average price of 8.513 cents. The decrease in quantity was 9,425,346 pounds, or 22.7 per cent., but on account of the higher price there was a slight increase in total value.

There is such a divergence between the records of lead contents of ores and concentrates shipped and recoveries at smelters from domestic and imported ores that the following records are presented for comparison:

	1916	1917
	Pounds	Pounds
(1) Production: Smelter recoveries from Canadian ore and recoverable lead in ore exported	41,497,615	32,072,269
(2) Lead contents of ores and concentrates shipped from mines in Canada	54,124,628	37,624,567
(3) Total production of lead bullion in Canada (including lead from imported ores) ..	43,100,236	41,427,304

The 1917 production included 30,077,230 pounds of lead in bullion of which a large portion was electrolytically refined and 1,995,039 pounds recoverable from ores exported. The lead bullion was produced chiefly at Trail with small contributions from smelters at Kingston and Galetta, Ont. (The total production of the smelters, including lead from imported ores, was, as noted above, 41,427,304 pounds.) The lead ores exported were derived from Notre Dame Des Ange, Que., the Surprise mine, Slocan, B.C., and the Silver King mine at Mayo, Yukon.

The total mine shipments of lead ores and concentrates was about 58,801 tons containing 37,624,567 pounds of lead as compared with shipments in 1916 of 84,516 tons containing 54,124,628 pounds of lead.

The exports of lead in 1917 were lead contained in ore concentrates, bullion, etc., 13,410,400 pounds valued at \$925,056. Exports in 1916 were: Lead in ore, etc., 9,048,400 pounds valued at \$558,180 and pig lead 112,100 pounds valued at \$7,710.

The average price of lead in January was 9.50 cents per pound advancing to a maximum of 14.62 cents in June, and falling again to 7.92 in November, and 7.96 in December, the average for the year being 11.137 cents. This is the producer's price for lead in car lots as per quotations furnished by Messrs. Robertson and Company.

Nickel.

The production of nickel in 1917 has, as usual, been derived from the ores of the Sudbury district, supplemented by the recovery of a small quantity of metallic nickel, nickel oxide and other nickel salts as by-products in the treatment of ores from the silver-cobalt-nickel ores of the Cobalt district.

The total production was 84,470,970 pounds worth at 40 cents per pound \$33,778,388, compared with 82,958,564 pounds valued at \$29,035,497, or 35 cents per pound in 1916.

Sudbury District: The total production of nickel-copper matte at the smelter of the Canadian Copper Company and the Mond Nickel Company in the Sudbury District was 78,897 tons containing 83,773,319 pounds of nickel and 42,392,588 pounds of copper, the average percentage of the combined metals in the matte being about 80—the tonnage of ore smelted (part being previously roasted) was 1,453,661 tons which, as usual, included a small tonnage from the Alexo mine in the Timiskaming District. The production in 1916 was 80,011 tons of matte derived from 1,521,689 tons of nickel copper ores smeltered, the matte containing 82,596,862 pounds of nickel and 44,859,321 pounds of copper.

The refinery under construction at Port Colborne, Ont., by the International Nickel Company had not been completed at the close of the year. The British American Nickel Corporation continued the development of its nickel properties, particularly at the Murray mine, and work was begun on the first unit of the smelter a mile distant from the Murray mine. It is expected that construction work on the refinery will be begun early in 1918.

Nickel was recovered as a by-product in smelters at Deloro, Thorold and Welland, from the silver-cobalt-nickel ores of the Cobalt district. Complete returns have not yet been received, but the total nickel contents of nickel oxide, nickel sulphate and metallic nickel produced have been estimated at about 697,000 pounds.

The products recovered in 1916 included 79,360 pounds of metallic nickel; 323,418 pounds of nickel oxide and 232,450 pounds of nickel sulphate having a total reported value of \$132,896 and containing 361,701 pounds of nickel metal.

The exports of nickel in ore matte or other form are reported by the Customs Department as 81,272,400 pounds valued at \$8,708,650.

The imports of nickel into the United States during the eleven months ending November, 1917, which included small quantities from other sources as well as from Canada, are recorded as 69,265,880 pounds contained in ore, matte, or other form valued at \$8,869,824, or an average of 12.81 cents per pound. The exports of nickel and nickel oxide, etc., during the same period, were 21,430,306 pounds valued at \$8,702,727 or an average of 40.61 cents per pound of which about 66 per cent. were consigned to Great Britain and 30 per cent. to Italy and France.

The values per pound of these exports to different countries ranged from 38.5 cents to 48.6 cents per pound. The average value per pound of exports in 1916 was 38.775 cents the range being from 37.13 cents to 45.21 cents. The average export value in 1914 was 34.26 cents.

The price of refined nickel in New York according to quotations published by the Engineering and Mining Journal continued at from 45 to 50 cents per pound for ordinary forms with 5 cents more per pound asked for electrolytic nickel, until March 7 from which date the quotation was from 50 to 55 cents.

Silver.

The production of silver in 1917 was 22,150,680 ounces valued at \$18,034,419 as against 25,459,741 ounces, valued at \$16,717,121 in 1916, a decrease



CAPTAIN O. E. LEROY

(Killed in action)

of 13.0 per cent. in quantity, but an increase of 7.9 per cent. in value.

The high value of the production in 1917 was exceeded only in 1912 and 1913, when the Cobalt camp was at the maximum of its output.

The production in Ontario amounted to 19,254,616 ounces valued at \$15,676,531, or 87.0 per cent. of the total production for Canada. In 1911, the year of its maximum production, the percentage was 93.8. The production was from the ores of Cobalt and adjoining silver camps, with the exception of 80,863 ounces, the output of the gold and copper mines.

Of the Cobalt district, production amounting to 19,173,753 ounces, 85.3 per cent, or 16,363,605 ounces were recovered in smelters and reduction works in Canada, and the balance 14.7 per cent., or 2,810,148 ounces were exported for smelting. Of the bullion produced in Ontario 9,929,326 ounces, or 60.7 per cent. was recovered in the mills of Cobalt and 6,434,279, or 39.3 per cent. recovered in southern Ontario smelters.

The production in Quebec was 217,191 ounces valued at \$176,830, as against 98,610 ounces valued at \$64,748 in 1916, and is derived from the pyritic ores of the Eastern Townships and the zinc-lead ores of Notre Dame des Ange, Portneuf county.

In British Columbia the production was 2,580,521 ounces valued at \$2,100,983 as against 3,392,872 ounces valued at \$2,227,794 in 1916, showing a decrease in quantity of over 23.0 per cent. and in value of 5.7 per cent. This production includes refined silver, silver contained in smelter products and estimated recoveries from ores exported.

The Yukon production amounted to 90,772 ounces valued at \$73,904 as against 360,101 ounces valued at \$236,446 in 1916, and included the silver derived from the placer operations with also a certain amount recovered from the gold and copper ores of Whitehorse and the silver-lead ores shipped from Mayo.

The exports of silver bullion and silver in ore, etc., as reported by the Customs Department were 21,718,784 ounces valued at \$17,621,398 as against exports in 1916 of 25,279,359 ounces valued at \$15,637,885.

The monthly average price of silver varied between a minimum of 73.861 cents per ounce in March and a maximum of 100.740 cents in September, averaging for the year 81.417 cents as compared with an average of 65.661 cents in 1916.

Zinc.

During the past two years there has been a recovery of refined zinc in Canada at the zinc refinery erected by the Consolidated Mining & Smelting Company at Trail, B.C. Prior to 1916 all zinc ore mined in Canada was exported for smelting and refining. The establishment of the Trail plant has resulted in the mining and treatment of a much larger tonnage of zinc ores and a portion of the present production is still being exported for treatment.

The total recovery during 1917 in Canada of refined zinc together with the zinc contained in ores exported (less 20 per cent. allowed for smelter losses) amounted in 1917 to 31,227,351 pounds, which, at the average price of spelter in New York, 8.901 cents per pound, would have a total value of \$2,779,547. The corresponding production in 1916 was 23,364,760 pounds, valued at \$2,991,623, or an average of 12.804 cents per pound.

Quebec, in 1917, is credited with 1,161,062 pounds, and British Columbia with 30,066,289 pounds. In 1916 the Quebec production was 1,663,200 pounds and British Columbia 21,701,560 pounds.

The total zinc ore shipments from mines in 1917 were about 116,660 tons containing, without any deduction whatever 61,920,149 pounds of zinc. The total ore shipments in 1916 were 82,077 tons containing 48,498,078 pounds of zinc.

Iron Ore.

The total shipments of iron ores from Canadian mines during 1917 were 215,242 short tons valued at \$758,261, as compared with shipments of 275,176 tons valued at \$715,107, in 1916. The 1917 shipments included 198,092 tons from mines in Ontario and 17,150 tons from mines in Quebec, and of the latter amount a considerable tonnage was from old stock piles. The ores comprised 197,602 tons of hematite and roasted hematite and siderite, 12,664 tons of magnetite and 4,978 tons of titaniferous ores.

The principal operating properties were the Helen and Magpie mines of the Algoma Steel Corporation, all of the ores mined being first roasted before shipment. The Moose Mountain Company continued development and experimental work in concentration and briquetting but made only small shipments.

In Quebec shipments of ilmenite were made from Ivory-on-the-Lake in Terrebonne county and of titaniferous ore from St. Urbain on the north shore of the St. Lawrence. Shipments of magnetite were also made from stock piles at the Bristol mine in Pontiac county and a small tonnage from Ironsides, in Hull township.

In the Great Lakes area the ore prices for 1917 were: Old Range Bessemer \$5.95 per gross ton; Messabi Bessemer \$5.75; Old Range Non-Bessemer \$5.20 and Messabi Non-Bessemer \$5.05—an increase of \$1.50 over the 1916 prices. The same quotations have been continued into 1918.

Mine operators reported 169,192 tons of ore exported to the United States and 46,050 tons shipped to Canadian furnaces.

The Customs Department shows exports of iron ores 164,004 tons valued at \$660,673 and imports amounting to 2,251,397 tons valued at \$5,124,889.

The total quantity of iron ore charged to blast furnaces in 1917 was 2,176,296 tons of which 92,065 tons were of domestic origin and 2,084,231 tons imported. The imported ore included 874,134 tons of Newfoundland ore and 1,210,097 tons of "Lake ore."

Shipments of iron ore from Wabana mines, Newfoundland, in 1917 by the two Canadian companies operating there were 883,346 short tons, as against 1,012,060 tons in 1916, all of which went to Sydney and North Sydney in Cape Breton.

Pig Iron.

The production of pig iron in blast furnaces during 1917 was supplemented by a small production of high grade low phosphorous pig iron in electric furnaces made from shell turnings and other steel scrap. The total production from both sources (not including the output of spiegeleisen, or other ferro-alloys) was approximately 1,171,789 short tons (1,046,240 gross), final returns not yet having been received from all manufacturers of electric pig iron. Of the total, 1,156,789 tons were produced in blast furnaces and the balance in electric furnaces. In 1916 the production all made in blast furnaces was 1,169,257 short tons (1,043,979 long tons).

The small increase in pig iron production in 1917 was therefore due entirely to the electric furnace production, there having been an actual falling off in the

The production in Nova Scotia in 1917 was 472,147 tons as against 470,055 tons in 1916. In Ontario the production by blast furnaces in 1917 was 691,632 tons as against 699,202 tons in 1916.

By grades the 1917 production included: Basic 14,092 tons; Bessemer 961,656 tons; Foundry and malleable, etc., 181,041 tons; electric furnace pig (subject to revision), 15,000 tons. The 1916 production included: Basic 953,627 tons; Bessemer 31,388 tons; foundry and malleable, etc., 184,242 tons.

The blast furnace plants operated were the same as in the previous year, viz.: the Dominion Iron & Steel Company at Sydney, N.S., the Nova Scotia Steel & Coal Company, at North Sydney; The Standard Iron Company at Deseronto, Ont., The Steel Company of Canada, at Hamilton, Ont., The Canadian Furnace Company, at Port Colborne, Ont., and the Algoma Steel Corporation, at Sault Ste. Marie, Ont.

Pig iron was made in electric furnaces by: The Canada Cement Company, Ltd., Montreal; Fraser, Brace & Company, Ltd., Shawinigan Falls, Que.; British Forgings, Ltd., Toronto, Ont.; Electro Foundries, Ltd., Orillia, Ont., and Turnbull Electro Metals, Ltd., St. Catharines, Ont.

The total production in electric furnaces of pig iron, ferro-alloys and steel ingots and castings was in 1917 about 99,000 short tons.

The production of ferro-alloys in Canada in 1917, chiefly ferro-silicon but including also spiegeleisen, ferro-molybdenum and ferro-phosphorous, all with the exception of the spiegeleisen being made in electric furnaces, reached a total of 40,341 tons valued at \$3,408,906, as against a total in 1916 of 28,628 tons valued at \$1,777,615.

The exports during 1917 of pig iron were 12,081 tons, valued at \$423,814, or an average of \$35.08 per ton and of ferro-alloys 33,212 tons valued at \$2,616,924, or an average of \$78.79 per ton.

The imports during 1917 included 82,758 tons of pig iron valued at \$2,744,055, or an average of \$33.16 per ton; 632 tons of charcoal pig iron valued at \$19,447, or an average of \$30.77 per ton, and 12,828 tons of ferro-alloys valued at \$2,029,990, or an average of \$158.25 per ton, making a total import of pig iron and ferro-alloys of 96,218 tons valued at \$4,793,492. The United States trade records show exports to Canada during the eleven months ending November, 1917, of pig iron and ferro-alloys amounting to 130,087 gross tons (145,697 short tons) valued at \$5,170,005, a figure considerably higher than the Canadian record.

Steel.

The estimated production of steel ingots and direct steel castings in 1917, final returns for all operations not yet having been received, was 1,736,514 short tons, (1,550,459 gross tons) of which 1,690,170 tons were ingots and 46,344 tons direct steel castings.

The total production in 1916 was 1,428,249 tons compared with which the 1917 production shows an increase of 308,265 tons, or 21.6 per cent.

The total production of electric steel in 1917 was probably not less than 50,000 tons as against 19,639 tons in 1916 and 5,625 tons in 1915.

The exports of steel ingots, or billets, ingots and blooms, during the nine months ending December (such exports not being separately classified previous to April, 1917) were 41,558 tons valued at \$1,831,917. The recorded imports of iron and steel ingots and billets during the year was 20,429 tons valued at \$1,378,576. This item is also much lower than the United States trade

record which shows exports to Canada during eleven months ending December of 143,209 gross tons (160,394 short tons) of billets, ingots and blooms of steel valued at \$11,418,033.

Asbestos.

The production of asbestos continues to increase under the stimulation of war demand. The product has been marketed at much higher prices and the total sales show a substantial increase. Stocks on hand at the end of 1917 were slightly in excess of those reported at the end of 1916.

In addition to the production in the Province of Quebec which is derived from the asbestos areas at Black Lake, Thetford, Robertsonville, East Broughton and Danville, there is also included in the record of production, as given herewith, a small output of crude asbestos amounting to 10 tons valued at \$2,150 produced and shipped from the Porcupine District in the Province of Ontario. These Ontario operations have been discontinued for the present but indicate the possibilities of sources of supply other than the well known areas in Quebec.

Exports of asbestos during the calendar year 1917 were 93,932 tons, valued at \$4,903,326, or an average of \$52.20 per ton and asbestos sand and waste 52,088 tons valued at \$430,956, or an average of \$8.27 per ton. There was also an export of manufactures of asbestos valued at \$55,666.



Lieut. W. M. Goodwin, M.C.

The exports in 1916 were 96,775 tons of asbestos valued at \$3,872,463, or an average of \$40.01 per ton and asbestos sand and waste 33,564 tons valued at \$241,272, or an average of \$7.18 per ton; also manufactures of asbestos valued at \$4,741.

Chromite.

The total shipments of ores and concentrates by mine operators was 36,352 tons valued at \$490,001 containing approximately 8,626 tons, or an average of about 23.7 per cent., Cr_2O_3 . A portion of these shipments was made to the Customs mill at Lakeside, Black Lake, operated by the Mutual Chemical Company and the final shipments from the District of ores and concentrates was 23,327 short tons valued at \$572,115, and containing approximately 8,465 tons of Cr_2O_3 , or an average of 36 per cent.

Most of the concentrates shipped averaged 50 per cent. Cr_2O_3 , while a large percentage of the ore shipments averaged about 32 per cent.

The production was, as usual, obtained from the Eastern Townships of Quebec, chiefly at Black Lake and Thetford, with an important contribution from the new area at St. Cyr in the township of Cleveland, Richmond county.

The mine operators' shipments in 1916 were 27,517 tons, valued at \$311,460, and containing approximately 6,759 tons, or an average of 24.5 per cent. Cr_2O_3 .



Capt. Stuart M. Thorne.



Lieut. Isidore Duchesne Drake-Daimpre.

Of this amount, 14,242 tons were sold to a customs concentrator, and the final shipments of ores and concentrates during the year was 14,321 tons.

The exports of chromite as reported by the Customs Department were 19,229 tons valued at \$342,528 as against 12,633 tons valued at \$152,534 exported in 1916.

Coal and Coke.

Coal:—The total production of marketable coal during 1917 (comprising sales and shipments, colliery consumption and coal used in making coke or used otherwise by colliery operators) was less than the 1916 production by 467,807 tons, or 3.2 per cent. in quantity, but greater in total value by \$8,826,165, or 22.7 per cent.

Production, imports and exports and consumption during 1916 and 1917 were as follows:

	1916.		1917.	
	Short tons.	Value.	Short tons.	Value.
Production ...	14,483,395	\$38,817,481	14,015,588	\$47,643,646
Exports	2,135,359	7,099,387	1,733,156	7,387,192
Imports	17,580,603	38,289,666	20,857,460	70,562,357
Consumption ..	29,928,139	.....	33,139,892	.....

The exports fell off by 402,203 tons, or 18.8 per cent., the imports were increased by 3,276,857 tons, or 18.6 per cent., the apparent consumption increased by 3,211,253 tons, or 10.7 per cent.

The total output of coal, including waste and unmarketable slack was, in 1917, 14,411,011 tons, as against 14,815,703 tons in 1916.

The 1917 production included 108,225 tons of anthracite, all from one mine in Alberta; 11,135,095 tons of bituminous coal, and 2,772,268 tons of lignite coal.

The provinces of New Brunswick, Saskatchewan, Alberta, and the Yukon made greater production of coal during 1917, and with the exception of the Yukon, show the highest annual production on record. The total increases in these provinces was 284,781 tons. The total decrease in Nova Scotia and British Columbia was 752,588 tons, leaving a net decrease as already shown.

The Nova Scotia production fell off 587,456 tons, or 8.5 per cent., as compared with 1916; New Brunswick increased 45,120 tons, or 31.4 per cent.; Saskatchewan increased 74,004 tons, or 26.3 per cent.; Alberta increased 164,085 tons, or 3.6 per cent., notwithstanding the serious loss of output due to strikes; the British



Capt. George C. Riley, 6th Howitzer Brigade.
Formerly Secretary of the Montreal Branch, C.M.I.

Columbia production fell off 165,132 tons, or 6.4 per cent.; the Yukon production, though small, shows a large percentage increase.

The total imports in 1917 included 15,537,262 tons of bituminous coal, valued at \$42,452,771, or an average of \$2.72 per ton, as against 13,009,788 tons valued at \$17,073,303, or an average of \$1.24 in 1916, showing an increase in 1917 of 2,527,474 tons, or 19.4 per cent.; and 5,320,198 tons of anthracite, valued at \$28,109,586, or an average of \$5.28 per ton, as against 4,570,815 tons, valued at \$22,216,363, or an average of \$4.86 in 1916, an increase in 1917 of 749,383 tons, or 14.1 per cent.

WALLINGFORD MICA AND MINING CO.

Mr. E. Wallingford, manager of the Wallingford Mica and Mining Co., Ltd., operating mica mines at Perkins' Mills, Quebec, reports an excellent demand for mica and great activity at the company's mines. At the old Wallingford mine, a four-drill compressor was installed and over 100 tons of culled mica produced in 15 months of 1916 and 1917. Crosscutting was carried on at the same time in the old pit at 180 ft. depth to lodes, one of which is rich in very fine soft amber mica.

Development work was also carried on successfully at the Rainville, or Wallingford No. 2 mine, which is on the east half of lot 15, Range 8, North Templeton. Nine veins were found, and one of these deposits now being worked yields very large mica. Mr. Wallingford reports that one crystal, 5 ft. 4 in. in diameter, yielded over 3 tons of mica of the amber variety.

The company has about 20 men employed in the mines, and 30 to 40 cullers. Twice as many men would be used if they could be obtained. Much of the mica is used for war purposes.

Mr. W. E. Simpson, of Cobalt, has arranged to periodically visit the Kaladar district as consulting engineer for the Cobalt-Frontenac Mining Co.

Sir Boverton Redwood, Bart., Director of Petroleum Research for Great Britain, has been appointed by the Government Director of Technical Investigations, in the recently-created Petroleum Executive, with a view to his dealing with technical questions of the highest importance, including the co-ordination of the work of petroleum production and that of petroleum

Mr. Ross H. McMaster, assistant general manager of the Steel Company of Canada, has left for Washington, where he will act on the new Canadian War Mission Board, of which Lloyd Harris, of Brantford, is the chairman.

The late W. H. Brethour, who recently lost his life by being frozen when on the Atlin trail, near Carcross, was born in North Saanich, Vancouver Island, B.C., on March 31, 1879. On the outbreak of the South African war he offered his services to the country, and went with the First Canadian Contingent to the seat of hostilities, where he remained until six months after the declaration of peace.

On returning home he took up the study of mining engineering, putting himself through the University of California. His professional career started with the Douglas Island mines, in Alaska, which concern he was with until he transferred his connections to the Guggenheims, at Atlin. Three years ago he was sent to South America by a French mining company for the winter months to report on gold finds at the headwaters of the Amazon, after which he returned to the Yukon and continued work on the placer gold claims of the Company on Otter Creek, in Atlin mining division of British Columbia. After years of hard work on construction he completed his task and had just finished a successful mining season when he was so suddenly called away.

The deceased was a son of Mr. John Brethour, of Sidney, and was well known on the whole of the peninsula.



Lt. Col. J. E. Leckie, D.S.O.

Molybdenite Deposits of Quyon District, Quebec

By M. E. Wilson.

The numerous uses to which molybdenum and its compounds and alloys are now being applied, especially in the manufacture of certain special types of steel in much demand for military purposes, and the consequent high price paid in some countries, has brought about during the war a widespread search for molybdenite, the principal ore of molybdenum. As a result numerous occurrences of this mineral have been found in various parts of Canada and notably in the Ottawa Valley to the north and west of Ottawa. Of these discoveries, probably the most important is that occurring on lots 9 and 10 in the 10th Range of Onslow Township, 3 miles north of the village of Quyon. From this property approximately 300,000 lbs. (estimated) of molybdenite concentrates has been produced in less than two years' operation.

The presence of a knob of molybdenite-bearing rock in the rear of the farm buildings on the farm of Mr. Robert Steel, lot 9, Range VII, Onslow township, had been known to the inhabitants of the district for many years; but it was not until 1915 that attention was directed to the occurrence. In the autumn of that year Messrs. Arch. MacLean and Authur Latimer procured an option on the property and the following March sold their option to Messrs Harvey Fitzsimmons of Ottawa and Henry Wood of Denver, Colorado, who formed the Canadian-Woods Molybdenite Company to purchase and operate the property.

The newly organized company immediately began shipping ore to the concentrating plant of Henry Wood, in Denver, and to the ore dressing laboratory of the Department of Mines in Ottawa. A few car loads of ore were also shipped to the plant of the International Molybdenite Company at Renfrew, Ontario. Later, in 1916, a mill having a capacity of approximately 50 tons per day was built on the property and a second concentrating plant was secured by installing Wood's flotation machines in the plant of the Canada Cement Company at Hull, Quebec.

Early in 1917 Mr. C. A. Foster, of Haileybury, Ont., procured an option on the mine from the Canadian-Woods Molybdenite Company and later purchased the property on behalf of an American syndicate operating under the title Dominion Molybdenite Company. During the summer of 1917 this company car-

ried on extensive diamond drilling operations to determine the extent of the deposits and enlarged the capacity of the mill to 200 tons per day. In the new mill, the Callow system of concentration was installed in place of the Wood flotation machines.

Geological Relationships of Quyon Molybdenite Deposits.

The Quyon district lies on the southern border of the Laurentian highlands, which occupy the greater part of north eastern Canada, and in common with the greater part of this great upland is underlain, for the most part, by those ancient Pre-Cambrian formations which, because of their highly deformed or otherwise metamorphosed condition are commonly grouped together as the "basal complex." The detailed succession of formations within this complex as represented in eastern Ontario and the southern Laurentians of Quebec has not yet been completely worked out; but the results of investigations in scattered localities seem to indicate that four principal groups of rock are represented as follows: (1) A group of recrystallized marine sediments known as the Grenville series. (2) A group of igneous pyroxenic rocks, gabbro, anorthosite, pyroxene, syenite, etc., intrusive into the Grenville series. (3) Batholithic masses of granite and syenite intrusive into the rocks of groups 1 and 2, and (4) Masses of diopside, scapolite and other lime-silicate minerals (pyroxenite), formed by the contact action of rocks of groups 2 and 3 on the limestone member of the Grenville series. It is the third of these groups that is of special interest in this connection since it is with these rocks that the Quyon molybdenite deposits are associated.

In the region northwest of Ottawa the border of the Laurentian highlands is marked by a steep, rocky, northwesterly trending escarpment, several hundred feet in height, which rises in striking contrast with the flat, clay-covered lowland to the southward. This remarkable topographic feature parallels the north shore of the Ottawa River as far as the western part of the township of Onslow, where it terminates abruptly, giving place to the more characteristic, poorly defined highland border consisting of rocky knobs protruding through clay flats.

At the western termination of this escarpment in the 7th Range of Onslow township a stock-like mass of fine, pink quartz-syenite, in which numerous masses of an older coarse porphyritic syenite are included, is exposed throughout an area approximately one mile wide from north to south and two miles long from east to west. The larger part of this mass lies in the upland above the escarpment; but two outliers outcrop in the lowland below. Within this pink syenite and in the adjacent intruded rocks, molybdenite occurs in thin seams, in small aggregates and disseminated in masses of siliceous, pyritic rock which have apparently segregated from the syenite. Five deposits of this segregated type in all have been discovered: three in a low ridge protruding through a sandy, wooded flat at the north end of lots 9 and 10, Range VII, Onslow, and two on the slope of the main syenite mass which forms a part of the Laurentian escarpment, a few hundred yards to the northeastward. Most of these



Main Pit, Dominion Molybdenite Mine, July, 1917.



Concentrating Mill, Dominion Molybdenite Co., Quyon, Quebec.

occurrences are too limited in extent to be of commercial importance. It is the main segregated mass, outcropping in the low eastward tending ridge at the south end of lots 9 and 10, from which most of the molybdenite produced from the property of the Dominion Molybdenite Company has been mined.

Character of the Quyon Molybdenite Deposits.

The molybdenite deposits of the segregated type are irregular, poorly-defined masses, generally elongated in a north-northeasterly direction. They are known as deposits number 1 to 5 in the order of their importance. The number 1 deposit is exposed on the faces and bottom of the number 1 pit, and is approximately 50 ft. wide and 200 ft. long. The number 2 deposit outcrops on the hill slope at the north end of lot 9 and is approximately 150 ft. long and from 5 to 25 ft. wide. Deposits number 3 and 4 are smaller masses, 15 and 4 ft. in width respectively, outcropping on lot 9 to the northwest of the main pit. Deposit number 5 is a small, irregular mass 10 ft. in diameter exposed near the bottom of the Laurentian escarpment on lot 11, Range VII, in Onslow township.

The ore consists for the most part of granular quartz and feldspar—chiefly microcline—in which pyrite, pyrrhotite, fluorite and molybdenite occur, partly in disseminated form and partly in aggregates up to several feet in diameter. In places within the deposits, crystals of a dark green pyroxene, some of which are radially disposed, are abundantly developed. At a few points coarse aggregates of a black biotite were observed. Where masses of pyrite occur in the rock, the pyrite cubes very commonly assume a peculiar net-like distribution, the interspaces of the net being filled with quartz, magnetite and limonite. The molybdenite and other sulphides disseminated in the lean ore are very commonly distributed in linear zones parallel to the longer direction of the deposit so that the rock exhibits a banded structure. It is obvious that the proportion of molybdenite in deposits of such irregularity varies greatly in different parts of each ore mass and that it is not possible to definitely estimate the percentage of molybdenite contained in an orebody from the proportions recovered from the parts of the deposit already mined. It is probable, however, that at the time the writer made his examination of the deposits, the average molybdenite content of the ore exposed on the bottom of the No. 1 pit did not exceed three-quarters of one per cent., and that the average contained in the exposed surface of the No. 2 deposit was probably less than one-half per cent.

Origin of Quyon Molybdenite Deposits.

It has been suggested* that the Quyon molybdenite

deposits possibly represent metamorphosed and mineralized blocks of Grenville limestone included in the Onslow syenite mass, an hypothesis that might be inferred from the presence of pyroxene and fluorite, two common mineral constituents of contact metamorphic deposits. However, the pyroxene contained in the molybdenite deposits is an iron-magnesium variety such as commonly occurs in igneous rocks and not the lime variety common in metamorphic deposits. Furthermore, since the feldspar present is largely microcline, it is probable that the lime content of the molybdenite ore deposits, taken as a whole, is limited largely to the fluorite and is not greatly in excess of that contained in most igneous rocks of the syenite class. On the other hand, the similarity in the mineralogical composition of the ore rock to the quartz syenite enclosing the deposits; the complete gradations from the quartz syenite into ore rock which occur everywhere along the margins of the ore deposits; and the presence of small aggregates of quartz, fluorite and molybdenite—miniature ore deposits—at numerous points within the syenite, would seem to indicate that the material contained in the ore deposits had originally formed a part of the syenite mass and had segregated together into the ore masses.

Why the material aggregates composing the ore deposits accumulated at certain points is not at all apparent. The syenitic wall rock of most of the deposits contains inclusions of the older porphyritic syenite, and it is possible that the presence of these masses may have been a factor in the precipitation of the ore material; but inclusions of the older syenite are so common in the Onslow mass that it is also possible that their association with the ore deposits is wholly accidental. The ridge in which the main orebody is situated at its western end is composed of the pink quartz syenite. At its eastern end, on the other



Diamond drills in operation on Dominion Molybdenite property

hand, it consists of the older porphyritic syenite cut by dikes of the quartz-syenite, so that the orebody in reality lies on the margin of the area of continuous syenite exposed in the western part of the ridge and what might represent a marginal segregation from this mass. The border of this area of continuous syenite in other directions, however, is buried beneath the sandy flat surrounding the ridge, and whether or not similar relationships hold at other points on the border of the mass cannot be determined. As far as the writer was able to observe, therefore, all that can be concluded with regard to the factors determining the development of the ore masses at certain points is that it is possible that in part, at least, their development was controlled by the contact relationships of the Onslow syenite with the older porphyritic syenite which it intrudes.

SHAWINIGAN COMPANIES HAVE SUCCESSFUL YEAR.

The rapid development of the Shawinigan Water and Power Company is again demonstrated by the report for the year ending December last, presented to shareholders at the annual meeting. Gross earnings for the year amounted to \$2,902,210, compared with \$2,325,872 for 1916, an increase of \$576,338, or 25 per cent. Operating expenses, maintenance, and taxes amounted to \$752,842, leaving \$2,149,367, from which was deducted fixed charges totalling \$698,503, and depreciation reserve of \$100,000, leaving the net profits for the year at \$1,350,864.

President J. E. Aldred, in his report, said in part:

"A new works has been constructed at Shawinigan Falls by the Canadian Aloxite Company, Limited, a subsidiary of the Carborundum Company of America. This plant will require about 12,000 horse-power, will employ a large number of hands, and is an important addition to the industries at Shawinigan Falls. The works are now substantially completed, and the installation of equipment is going on. It is expected that within a short time the plant will be in full operation.

"The Canada Carbide Company has enjoyed the best year in its existence, not only in respect of output, but also as regards the financial result. In spite of the largely increased cost of manufacture, due to the increased cost of raw materials, the company has been able to attain satisfactory results. Its output is now at the highest point in the history of the company, and it is anticipated that the next year will prove to be even more successful than 1917.

"Closely allied with the Canada Carbide Company, is the Canadian Electrode Company, which manufactures carbon electrodes, largely for use in the Carbide furnaces. This plant has proved to be an important factor in the operation at Shawinigan, and has in its turn made a satisfactory result, not only in output of product, but in profit on that product. The Canadian Electro Products Company is also now operating on a satisfactory basis. Various accidents and delays occurred in attaining results, and for some time the plant was operating under serious handicaps. A new contract, however, has been made with the Imperial Munitions Board, extending the operation of the plant throughout 1918. This contract has been made under such terms and conditions that the results will prove very advantageous to the company.

"There has developed, during the past year, a situa-

especially favorable to all water-power enterprises. The coal situation in the United States has become uncertain; large industries are shut down for want of coal; public service enterprises driven by steam, have been obliged to reduce their output on account of the scarcity of coal. It is obvious that the effect of this condition will be lasting and manufacturers using electricity will so far as possible prefer to obtain it from reliable waterpowers. In general, it may be stated as regards hydro-electric development, that time is on its side, and the future cannot fail to be advantageous to it.

"The policy of your company has been to develop industries in the Province of Quebec, and particularly in the valley of the St. Maurice River, looking forward to intense industrial activity in this section of the country, based on the favorable natural conditions which exist in this section.

"While a great amount of power is being used in the manufacture of chemicals, aluminum and other commodities now being used for war purposes, it should be noted that in almost every instance these works were in full operation previous to the war, and will doubtless be in full operation after the war as well."

Mr. J. G. Dickenson, general manager of the O'Brien Mine, Cobalt, and the Miller Lake-O'Brien Mine, Gowganda, has returned to Cobalt after a six weeks' trip of inspection of the O'Brien Company's properties in Arizona, California and New Mexico.

Mr. C. J. Girvin, of Denver, Colorado, was in Toronto last week, and is now visiting Northern Ontario mining districts.



Major Neil R. Macdonald (by his intimates and friends affectionately termed "Fog-horn"), of the "Black Devils."

The Magnesite Industry of Quebec

By Howells Frechette, M.Sc.

In the table of output of twenty-three products of the mines of Quebec, magnesite occupied, in 1913, the 21st place in order of value. In 1916 it had risen to the 5th place. In 1913, only 515 tons, valued at \$3,335, was produced, while in 1916, 53,976 tons was produced, valued at \$525,966.*

This immense increase of production is directly attributable to the war. In 1913, the United States produced less than 10,000 tons of crude magnesite, while importing crude and calcined magnesite equivalent to about 350,000 tons of the crude mineral. Owing to blockade, embargo and scarcity of bottoms, the importation from Europe was greatly curtailed. There was a serious shortage resulting in the employment of substitutes for magnesite, where possible, and also in greatly increased production of this mineral in the Western States of the Union and in Canada.

In Western Canada fairly large deposits of hydro-magnesite occur widely distributed. Most of these are distant from railroads and markets. One deposit at Atlin was worked to a very limited extent within the past three years.

Character of Magnesite Mined in Quebec.

Quebec possesses the only known workable deposits of magnesite in Eastern Canada. These are situated in Argenteuil county, about midway between Ottawa and Montreal, to the north of the Ottawa River. They occur in the Grenville series of the Archean formation. The magnesite is very similar in appearance to the crystalline limestone of this series, being coarsely crystalline and usually white, though sometimes blueish grey or yellowish. The magnesite rock forming the deposits is composed essentially of the mineral magnesite (magnesium carbonate). Dolomite (lime-magnesium carbonate) is the principal accessory mineral, being practically always present, sometimes constituting a large proportion of the rock. Serpentine, diopside and other minerals are frequently found disseminated, generally in small quantity, through sections of the deposits.

The following analyses will serve to illustrate the general composition of the magnesite rock:

Insoluble mineral matter	2.20	3.08	2.00	2.00	.74
Iron Oxide	.13	.29	.57	.50	.24
Alumina	.03	.35	1.47	.80	.36
Lime	8.80	10.06	5.80	6.95	10.05
Magnesia	39.12	37.76	41.34	40.76	38.52
Carbon dioxide	49.72‡	49.39†	49.66†	49.88†	49.86†

‡By difference.

†Calculated.

The insoluble siliceous matter, the iron and the alumina are usually low in percentage. The lime, even in selected samples, is seldom below six per cent.

According to Dr. M. E. Wilson,§ these deposits are associated with the metamorphosed group of sediments, crystalline limestone, garnet gneiss, and quartzite, composing the Grenville series, and in three localities the magnesite is found in close proximity to outcrops of the pyroxenic rocks of the Buckingham series. It is probable that these deposits were formed by the replacement of the lime by magnesia in crystalline limestone, the transformation being first to dolomite and finally to magnesite.

North American Magnesite Company.

The principal operators are the North American Magnesite Co., Ltd., and the Scottish-Canadian Magnesite Co., Ltd. Messrs. Fitzsimons, Boshart and Inglee have also made some shipments.

The North American Magnesite Company owns and operates quarries on lot 15, range IX, and lot 18, range XI, Grenville township, and operates under lease, a quarry on the north end of lot 13, range I, Harrington township. From all these quarries crude magnesite is shipped. Hauling to the railway at Calumet is done by wagons or sleighs, the distances from the various quarries ranging from nine to sixteen miles.

Caustic Magnesia and Dead Burned Magnesite.

At the quarries on lot 15, range IX, some of the magnesite is calcined in a Keystone lime kiln and shipped as caustic magnesia. The company also produces dead burned magnesite at Longue Pointe, near Montreal. The burning is accomplished in one of the rotary cement kilns of the Canada Cement Co., Ltd.

Scottish-Canadian Magnesite Company.

The Scottish-Canadian Magnesite Company owns and operates quarries on lot 15, range X, and lot 15, range XI, Grenville township. The crude magnesite is transported to Grenville, a distance of fourteen miles, over a narrow gauge railway. Dead burned magnesite is produced by this company at the plant of the Canada Cement Co., at Hull.

Magnesite Available.

Dr. Wilson, in his report already referred to, makes the following summarized statement of the number of tons of magnesite and magnesite-dolomite in sight in the various properties referred to above.*

Property.	Magnesite containing less than 12 per cent. CaO tons.	Magnesite-dolomite containing more than 12 per cent. CaO tons.
Lot 13, range I, Harrington Tp.	25,000	8,000
Lot 18, range XI, Grenville Tp..	15,000	6,000
Lot 15, range XI, Grenville Tp..	418,000	186,300
Lot 15, range X, Grenville Tp...	2,500	4,000
Lot 15, range IX, Grenville Tp...	226,400	279,400
Total	686,900	483,700

§ "Magnesite Deposits of Grenville District, Argenteuil County, Quebec." Memoir 98, Geological Survey, Department of Mines.

* It must be noted in this connection that these estimates have no definite relationship to the amount of magnesite present on the various properties since some deposits have been more extensively developed by diamond drilling and other development.

* According to the Preliminary Report on the Mineral Production of Canada, issued by the Mines Branch, Ottawa, the production of magnesite in the Province of Quebec during 1917 was 58,090 tons of crude, caustic calcined and dead burned, valued at \$728,275.

Method of Mining Magnesite.

Quarrying is carried out by open cast methods, the rock being broken down by blasting and sledging to "one man size." In working the quarries endeavor is made to avoid those parts of the deposits in which the lime content runs high. The quarried material is cobbled to free it from excessive amounts of serpentine and highly dolomitic rock.

Magnesite and Its Products.

The magnesite is placed on the market in three forms: 1. Crude magnesite. 2. Light burned magnesite or caustic magnesia; and 3. Dead burned magnesite.

1. **Crude magnesite** is the hand-picked product of the quarry. It is shipped in lumps weighing 100 pounds or less.

2. **Caustic magnesia or light burned magnesite** is produced by calcining the crude rock in a retort or shaft kiln at a temperature of about 1100°C. The carbon dioxide is not completely driven off, about 2 or 3 per cent. remaining. It is shipped in lump form or pulverized.

3. **Dead burned magnesite** is that from which practically all of the carbon dioxide has been expelled by calcining at a very high temperature. For the uses to which dead burned magnesite is put, it is desirable that it be fully shrunk, or in other words, in as dense a form as possible. The shrinkage is due to incipient fusion, or sintering. Since the Grenville magnesite contains such small quantities of fluxing impurities, it is practically impossible to shrink it without the previous addition of some other material. The practice at Hull and at Longue Pointe is as follows:

Method of Burning Magnesite.

Crushed magnesite, mixed with approximately five per cent. of its weight of oxide of iron, in the form of magnetite, is ground in a ball mill to a fineness of "100 mesh size." This finely ground and intimately mixed material is fed at a uniform rate into the rotary cement kiln, through which it passes in counter direction to the flames. During its passage through the kiln, which requires in the neighborhood of three-quarters of an hour, the magnesite yields its carbon dioxide and the residual magnesia combines with the oxide of iron. The result is the magnesia is rendered somewhat less refractory and, when subjected to the intense heat near the firing end of the kiln, the small particles soften slightly, shrink in bulk and develop a tendency to agglomerate. Small balls, averaging half an inch in diameter, are formed as the material is tumbled along its course through the rotating kiln. From the kiln they fall into a bucket conveyor which delivers them to the shipping shed.

Uses of Magnesite.

The great bulk of magnesite consumed is used either in the caustic or dead burned state, the calcining being done by the mining companies or by firms making a business of preparing refractory materials for the market.

The crude rock is used in the preparation of various magnesian chemicals, such as Epsom salt and magnesium chloride. It is used for the production of the metal magnesium by the electrolytic process. It is also employed in the manufacturing of wood pulp by the sulphite process. The magnesite may be used in the calcined form for the foregoing purposes.

When finely ground caustic magnesia is mixed with a solution of magnesium chloride, it forms a cement

known as Sorel, or oxychloride cement, which sets rapidly. This property has found for it a very extensive use as a flooring material.

The dead burned magnesite is used exclusively as a refractory material, especially for linings for open hearth steel furnaces and for electric and other furnaces where a very high temperature is employed. These linings may be prepared in place by building up layer upon layer of magnesite to which some bonding material has been added and subjecting it, during the procedure, to high temperature, or the magnesite may first be made up in the form of bricks and built into place in the usual manner.

During 1917 the price of crude magnesite averaged between \$10.50 and \$11.00 f.o.b. Calumet, Quebec, the caustic magnesia \$25 and the dead burned magnesite as high as \$40 per ton.

KILLED IN ACTION.

Six members of the Canadian Mining Institute were killed in action during the past year: Lieut. C. St. G. Campbell, J. S. Fleming, Capt. G. G. Gibbins, Col. T. C. Irving, Lieut. O. E. LeRoy, and Lieut. C. P. McDougall.

In this issue appear reproductions of a number of photographs of members of the Canadian Mining Institute, who are serving, or have served, at the front. We publish these by courtesy of the Institute. We will be pleased to receive, for publication, photographs of members who have joined the colors. About 125 members of the Institute are now on military service.



Lieut. C. St. G. Campbell, R.F.C., who has been reported missing since April 6th, 1917.

Province of



Quebec

Department of Colonization, Mines and Fisheries QUEBEC

Mineral Production and Mines

Value of the Annual Mineral Production of the Province of Quebec for past years:

Years.	Value.
1900	\$ 2,546,076
1904	3,023,568
1908	5,458,998
1912	11,187,110
1916	13,287,024

The growth of the mineral industry of the Province, as indicated by the growth in the value of the production is remarkable, and yet it is insignificant compared to the potentialities and possibilities of our resources.

Quebec **Asbestos** mines produce over 80 per cent. of the world's supply of this substance.

Quebec **cupriferous pyrite** mines have been producing continuously for forty years, and one of them is 4,000 feet deep.

Quebec **Molybdenite** production is now on a solid basis, and one of the mines is the largest individual producer in the world.

Quebec **Amber mica** takes "first rank" for electrical machinery. It is the strongest, the most elastic and the best isolator.

Quebec **Magnesite** production has grown from 515 tons, valued at \$3,335 in 1913, to 65,000 tons, valued at \$725,000 in 1917.

Quebec **Metallurgical Industry** includes one of the world's large reduction works of **Aluminum**; a manufacture of **magnesium metal**; numerous steel furnaces, both electric and fuel.

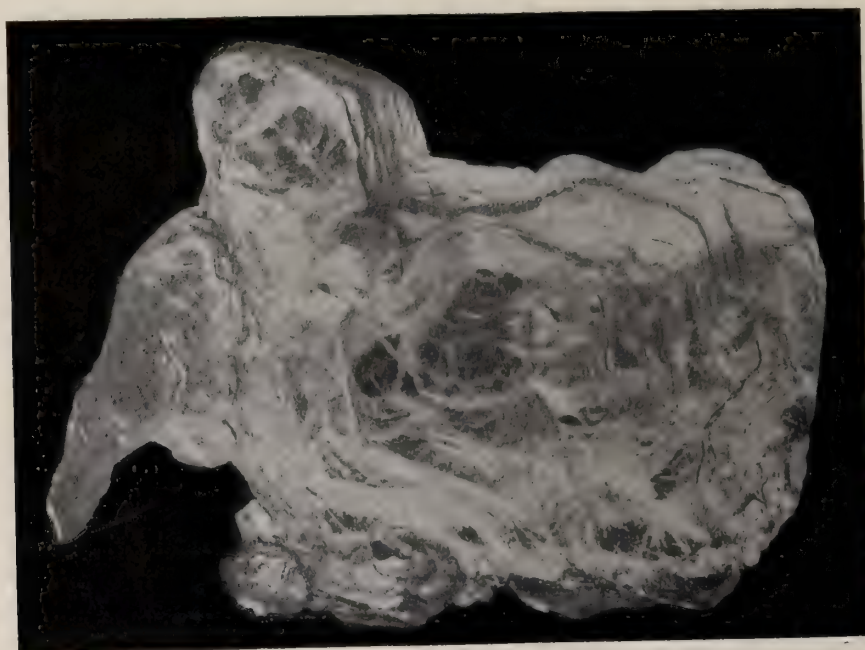
Address all inquiries for technical and statistical information to,

HON. HONORÉ MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES,
QUEBEC.

Molybdenite from Quebec

The Province of Quebec holds a prominent position as a producer of molybdenite. This is the source of the metal molybdenum, which is in great demand for the manufacture of war material. It imparts to steel special qualities of hardness and toughness, making it very resistant. Molybdenum steel is used extensively in the manufacture of large gun and rifle barrels. Moreover, molybdenum imparts to steel the quality of retaining its temper when heated to a redness, which enables it to be used for high speed cutting tools. This has revolutionized machine-shop practice, for whereas with ordinary crucible tool steel the

Molybdenite mining in Quebec first assumed importance in 1916 when ore yielding 129,275 lb. molybdenum sulphide was produced. Nearly all of this molybdenite came from the Moss mine at Quyon, near Ottawa. The property, which is in Onslow township, had been long known to contain molybdenite; but it was not until March 1916 that any development work was undertaken. A few weeks later a carload of ore was shipped to Denver, Colorado, to be concentrated in the plant of Henry E. Wood & Co. During 1916 several shipments were made to Denver and to the ore dressing laboratories of the Mines Department at Ottawa and to the



A MOLYBDENITE CRYSTAL FROM QUEBEC

average speed of cutting is from 30 to 40 feet a minute; high speed steel tools can cut 500 feet.

In 1917, the Province of Quebec produced over 70 tons of molybdenite. Several deposits are being worked in the region north-west of Ottawa, and at one of these, the Moss Mine, at Quyon, operated by the Dominion Molybdenite Company, a very complete concentrator has been installed. This mill is now treating 150 tons a day, by wet crushing and Callow cells. This process, after a period of experimentation, has given extremely satisfactory results, and it is claimed that a practically complete extraction of the molybdenite contents has been obtained. A large tonnage of ore has been blocked out by systematic diamond drilling, and the Moss mine deposit appears to be one of the most important molybdenite mines in the world.

Other important deposits, on which much exploration and development work was done in 1917, occur in the townships of Onslow, Huddersfield, Egan, Aldfield, Preissac, La Corne. In the course of the year 1918, several new producers will probably be added to the present ones. The Province of Quebec bids fair to become the world's most important producer of molybdenite.

concentrating plant of the International Molybdenum Company at Renfrew. The property was operated for some time by the Canadian-Wood Molybdenite Co. During 1917 a new company, the Dominion Molybdenite company, took over the property and is now operating the mine and has installed a concentrating plant. Mr. Clement A. Foster is manager for the new company, and Mr. M. W. Hotekin is assistant manager.

The Moss mine is about three miles from Quyon, a station on the Waltham Branch of the C.P.R., 33 miles from Ottawa.

Mr. Thos. Denis, Superintendent of Mines of Quebec, says of the ore. "The molybdenite is found disseminated in the rock in small flakes and powder. The dissemination is irregular, but very persistent, varying from a lean ore of one-tenth of one per cent., to highly concentrated nests or pockets running twenty per cent. or more in molybdenite." It is said that exploration by drilling indicates a very large body of ore that will average seven-tenths of one per cent. molybdenite.

There is much pyrrhotite and pyrite with the ore; but fortunately there is very little mica.

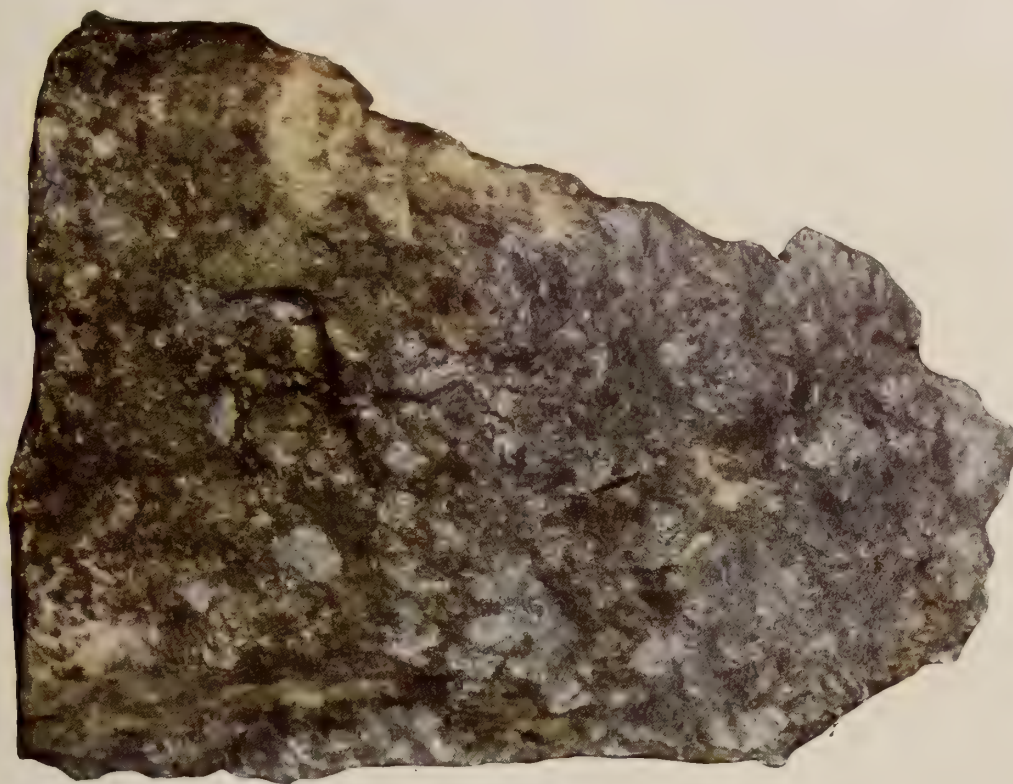
The molybdenite produced in Canada during the past two years has nearly all been taken by the Imperial Munitions Board at a price fixed in England. Recently the embargo on molybdenite has been removed and it should now be possible to export considerable quantities of molybdenite or ferro-molybdenum to the United States. Our exports to England have been largely in the form of ferro-molybdenum, this alloy being manufactured at Orillia and Belleville.

At a meeting of the New York section of the American Institute of Mining Engineers held on Sept. 27, 1917, the following comments on molybdenum were

employed in small quantities by the electrical and scientific instrument trades. Its salts figure as chemical reagents, pottery colorants and medicines. A salt of molybdenum is used as an explosive preservative.

"It is hoped that the war will prove to the steel workers the valuable properties of the metal, and by creating a demand for it, develop dependable sources and stabilize the supply. Tungsten, its chief competitor, has in the past enjoyed the advantage of a much better established production.

"The position of being the chief molybdenum producer has changed with remarkable frequency recently.



MOLYBDENITE ORE FROM MOSS MINE, QUYON, QUEBEC. DOMINION MOLYBDENITE CO.

presented in a paper prepared by S. H. Ball and published in a recent bulletin of the A. I. M. E.

"Molybdenum, perhaps more than any other metal, has had its production increased by the war. The 1916 production was in tonnage over twenty times, and in value perhaps 100 times, that of 1902. Its use for munitions prior to the war is shown by the fact that the principal consumers prior to 1914 were Krupp and Creusot. The 3 or 4 per cent. of molybdenum used by the Germans in their heavy artillery, and even in rifle barrels, notably prolongs the life of these weapons.

"The most important use of molybdenum in peace time is in steel and other alloys. Its consumption in tool steel appears to be at a standstill, but many feel that in this field the metal has not as yet had its final trial. The use of alloys containing molybdenum in automobile parts is increasing. The metal is also em-

In 1910 Queensland accounted for 50 per cent. of the production, New South Wales and Norway each almost 25 per cent., and Sweden and the United States produced small amounts. Active prospecting, fostered by war prices, caused the United States to take the lead in 1915, but this year Canada is apparently the most important producer. According to Mr. F. L. Hess, the world's 1915 production was equivalent to 222.6 tons of metal."

The Canadian Government has decided to license, until further notice, the free export of molybdenum, tungsten, their ores, concentrates and products to approved consignees in the United States and France. It is necessary for exporter to obtain license from Commission of Customs, Ottawa, previous to shipment and from the Bureau of Imports, War Trade Board, Bond Bldg., Washington, a license to import into the United States.

Province of



Quebec

Department of Colonization, Mines and Fisheries QUEBEC

Mineral Lands

Area of the Province..... 703,653 Square Miles
Crown Lands open to Prospection 650,000 “ “
All Lands Patented for Farming since 1880 are also open.

Each prospector can stake **200 acres** of mining lands in claims of 40 acres.

Terms of Quebec Mining Law are very favorable to the prospector.

Of the 703,653 square miles of the area of the Province, over 600,000 are underlain by Pre-Cambrian rocks.

It is in Pre-Cambrian rocks that occur the Silver deposits of Cobalt; the Gold deposits of Porcupine; the Nickel ores of Sudbury; the Copper ores of Bruce mines; the Iron ores of Lake Superior, and the Province of Quebec possesses 600,000 square miles of such rocks awaiting the prospector to reveal their riches.

Copies of Mining Laws, “Information for Prospectors”; Reports of the Mines Branch, and reports on economic geology of many regions may be obtained from the Department, as well as technical and administrative information.

Address all inquiries and requests for reports to,

HON. HONORÉ MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES,
QUEBEC.

ASBESTOS CORPORATION IN 1917.

Mr. W. G. Ross, president of the Asbestos Corporation of Canada, says of operations during 1917:

Under the adverse conditions that our company had to operate during the last twelve months, the results may be considered satisfactory. The statement of Profit and Loss for the year shows a net surplus of \$253,789, as compared with \$215,476 for the previous year, an increase of \$38,313, after making provision for the Income Tax, Renewals and Betterments, and Interest on Bonds.

In order to cope with the demand for raw asbestos, which, for the time being, continues to grow, we decided to open the East Broughton property, known as the Fraser mine. This necessitated the erection of a mill. As the old Dominion mill at Black Lake had not been operated for some years, owing to the fact that centralization of operations at Black Lake had resulted in all rock quarried being milled at the British-Canadian mills, and as the erection of a new building would have been very expensive, in view of the present high cost of building materials, it was decided to move the Dominion mill from Black Lake to East Broughton. This has now been accomplished. Due to delays in getting the necessary electrical equipment, motors, etc. (these being only delivered late in the year), it was not possible to obtain any results this year. This mill, however, is now completed, and the development of the mine is now being proceeded with.

Our Kings, Beaver and British-Canadian properties were operating throughout the year to the fullest extent commensurate with labor at the company's disposal. Due to want of men, it was not possible to

operate double shifts at all the properties. Had they been available, the output would have been larger.

The demand for our products continues excellent. Given more reasonable weather and working conditions during 1918, better results may be expected, provided always that transportation facilities do not grow worse. The shortage of cars, during the last months of the year, seriously affected our company's business.

The company subscribed for and was allotted a further \$200,000 of the Dominion of Canada Victory Loan Bonds, and purchased \$190,500 of the company's own bonds at market prices.

Quarterly dividends at the rate of four per cent. per annum, on the preferred stock, involving \$160,000, were declared and paid during the year.

THE LEAD ORE SMELTING SITUATION.

By E. Jacobs.

In both British Columbia and the State of Idaho there is trouble and dissatisfaction in regard to the charges and actions of operators of lead ore smelting works, and in both countries the combined action of mine-owners is urged with the object of securing government regulation of smelting works. The grounds on which government control is urged, though, are entirely different as regards Idaho from those on which strong complaint is made in the West Kootenay district of British Columbia.

Last year the Bunker Hill Mining and Concentrating Co., operating in the Coeur d'Alene district of Idaho, commenced smelting at its own newly established smelting works certain of its own ores of a grade it claims its contract with the American Smelting and Mining Co. does not compel it to ship to that company's smelting works. The A. S. and R. Co. brought an injunction suit with the result that a judge of the United States Court has granted a preliminary interlocutory order requiring delivery to the A. S. and R. Co. of the "normal" product of the Bunker Hill and Sullivan mines, pending trial of a suit to determine what goods of ore are "normal" product and so covered by that contract.

Following other editorial comment on the subject, Northwest Mining Truth, of Spokane, observes: "Mining Truth has reiterated the seriousness of the situation for more than two years and hopes that at some not too remote date the mining interests of this section will awake to the grave danger that threatens. It seems patent to us that the only efficacious manner in which the rapacity of the Trust can be finally curbed is by government regulation of smelters. That they are public necessities goes without saying and we believe the country is now in mood to take up the miners' demands to good purpose. Mining Truth will, therefore, commence a campaign to that end with its next issue, and will introduce the first resolution on the subject at the forthcoming Northwest Mining convention in this city. We ask the earnest attention of all mining men and their active support if our presentation of the subject meets with approval."

The stated reason for advocating Government control in Canada is stated by The Kootenayan, of Kaslo, West Kootenay, to be an increase in the "flat rate" for smelting, to be charged by the Consolidated Mining and Smelting Co., Trail, of \$5 a ton, with sundry deductions additional to those heretofore made. The Kootenayan reflects strongly on the Consolidated Company in this connection and urges government action.



The late Lieut. C. H. McDougall, killed in action early in

The Position of the Dominion Coal Co. in Nova Scotia

By F. W. Gray.

The "Halifax Herald" is, by way of being a general, not to say an impartial, iconoclast, and in connection with the mooted merger of the interests of the Dominion Steel Corporation with those of the Nova Scotia Steel and Coal Co., it has once more trotted out the hackneyed accusation that when the Nova Scotia Legislature put the seal of its approval on the incorporation of the Dominion Coal Company, and granted a 99 years' lease of the consolidated coal areas, that it bartered away the rights of the people of Nova Scotia for "the mess of pottage of 12½ cents royalty" and created a monopoly which has acted in restraint of trade and against the public interest.

What are the facts? When the Dominion Coal Company was incorporated, in 1893, the coal production of Nova Scotia was about 2,000,000 tons per annum, and the Dominion Coal Company itself contributed 800,000 tons to this total. In 1913, when the peak of coal production was reached in the province, the total production had risen to 7,263,000 tons, of which total the Dominion Coal Company contributed 4,739,000 tons, or 65 per cent.—not counting the output from the Springhill Collieries. At the time when incorporation was granted, the Dominion Coal Company undertook to pay for the privilege of the 99 years' lease a royalty of 12½ cents per ton, whereas all other operators paid 10 cents per ton, with an undertaking that the Government would receive a minimum annual royalty not less in amount than the total royalty monies collected from all the independent companies operating the consolidated areas in the year preceding amalgamation. If this limiting clause is to be taken as any indication of the extent of the future hopes of those who framed it, it must be admitted that their expectations were more than realized, for year by year the coal production of the Dominion Coal Company increased until the outputs of the years preceding 1893 have become merely a memory.

In the 20 years from 1893 to the end of 1912 inclusive, the Dominion Coal Company mined approximately 50,000,000 tons of coal, on which it paid 12½ cents per ton royalty. In the same period all the other operators put together mined approximately 35,000,000 tons of coal, on which they paid 10 cents per ton royalty. From the 1st of January, 1913, the Government imposed a royalty of 12½ cents per ton on all coal mined in the province. From the standpoint of the Government it would appear that the bargain with the Dominion Coal Company was justified by the results.

As to the effect of the Dominion Coal Company's operations on the people of the province, it may be confidently stated that if this large company had not been formed, and if coal-mining operations had been continued in the intermittent and detached manner which preceded the formation of the company, the production of coal would to-day be much smaller, the selling price per ton would be much higher, and the value of the mining areas would be infinitely less.

Several years ago the writer expressed the following conclusions*, which are now quoted as being written at a time when the consolidation of the Dominion and Scotia interests was not being talked of, and can there-

fore be regarded as being uninfluenced by any other considerations than those which relate to the beneficial effects of so-called "monopolies" as they have been exemplified in the history of the coal trade in Nova Scotia.

Generally reviewing the economics of the industry, the writer stated:

"From the standpoint of the investor, the operation of coal mines in Nova Scotia in the past has not been encouraging. Some of the coal companies, during prosperous times, and in the earlier and less expensive operation of their collieries, paid regular and handsome dividends over many years.

"In very few instances, however, in the history of coal mining companies in Nova Scotia has there been any likelihood of a redemption of the original capital outlay, and a very moderate interest return is all the investor has been able to hope for. The majority of the companies now operating have been compelled to undergo financial reorganization. Several companies have suffered complete financial disaster, in some cases brought about by physical conditions beyond control, and in other cases by unskilled management, or the unjustifiable optimism of promoters.

"Generally speaking, however, the mines of Nova Scotia have been well managed from an engineering point of view, and the meagre financial return in the past has been due to alterations in the fiscal policies of Canada and the United States, resulting in temporary disorganization of markets, to the remoteness of the principal markets, the interference, or stoppage, of coast-wise shipments by ice in the winter, and the comparatively low selling price of coal in Eastern Canada.

"Within the past twenty years the price of coal has varied very little, it being one of the few commodities that has not materially increased in selling value.

"It is doubtful whether the market for Nova Scotian coal has ever yielded the operators a greater price than \$2.50 per ton at the pit mouth, and the average price realized, after allowing for waste and slack coal, is very much less than this figure. A comparison with normal European pit mouth selling prices will show how moderate this figure is, if due consideration is accorded to the higher cost of labor and materials in Canada.

"The margin of profit has been too small to permit of the accumulation of proper reserves to provide against the troubles inseparable from mining coal, or to allow of adequate depreciation reserves for the amortization of capital liabilities and the depletion of coal areas. Therefore, periods of financial depression or mining accidents have too often forced the abandonment of mining operations and have involved investors in losses.

"The formation of the Dominion Coal Company was an evolution from these conditions, and whether it be a retrograde tendency or not, the logic of events has indicated the chief hope of settled prosperity in the Nova Scotian coal trade to lie in the further development of strong corporations, with adequate financial reserves. There is no reason to anticipate anything but a long and successful career for the coal companies of the province if these essential qualifications are given the consideration they deserve.

"Whatever financial stability attaches to the coal companies of Nova Scotia to-day, is a testamentary benefit conferred by the General Mining Association.

sible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices, and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tended to endanger by uncoordinated effort.

"The price of coal in Eastern Canada has always been dependent on the selling price in the United States, but it is candidly admitted, to-day, that coal has in the past been mined in the United States, and sold there and in Canada, at a price actually below the cost of production, when all the factors of that cost are taken into consideration."

That the "chief hope of settled prosperity in the Nova Scotian coal trade lies in the further development of strong corporations with adequate financial reserves" was never so apparent as it is to-day. The coal industry of the province is to-day in a period of recession. It has entered that phase of coal mining economics when the first pickings have become exhausted; when the thicker seams, and the easily accessible areas have practically disappeared; an era of rising costs of extraction, of increasing cost of wages and materials has commenced. The future of the coal industry of the province lies chiefly in the submarine areas, and the winning of these will call for large plans, for long views, for the expenditure of immense sums of money with the knowledge that such capital expenditure can only be recouped over long periods of time. Engineering plans will be required years in advance of their consummation, and some of the most far-reaching and fascinating projects of the mining engineer may see fruition off the shores of Cape Breton Island.

Operations conceived on the necessary scale are, however, only possible to large companies having the financial reserves to ensure their corporate existence and stability. The legislators of Nova Scotia never did a saner thing than when they incorporated the Dominion Coal Company, and gave that company the extended tenure of its lands and areas which made it possible to issue stocks and bonds secured on those areas. Ninety-nine years may seem a long time, and judged by the life of man, it is so long as to be tantamount to a freehold tenure, but it must be remembered that a corporation is an entity, created by the law with the right of continuous succession, an entity that may, and probably will, outlast all those who created it. It is now 25 years since the Dominion Coal Company was formed. That is to say, one-quarter of its lease period has expired, and to those who know the vast extent of the areas which this company, and this company alone, can operate, the criticism of the lease period which would naturally arise is that it is too short, too contracted to allow of the full development of the potentialities of the coal areas which it controls.

In a work descriptive of the Dominion Coal Company's operations, published in 1908, the writer stated with reference particularly to the Glace Bay Basin, that had this been worked as a virgin field by the Dominion Coal Company, or a similar consolidation of interests, the result would have been a marked conservation of our national coal resources, and incidentally, cheaper coal.* This statement cannot be controverted. It is so obviously correct; for, as the writer further stated at that time, "One could hardly

conceive from an engineering or economic standpoint a group of mines where an amalgamation of interests was more desirable, or where independent operation was more likely to have disastrous future consequences, alike as regards the profits of the operators, the revenue of the Provincial Government, or the price of coal to the consumer."

The foregoing remarks are not intended to have any bearing upon the rumored merger of the large Sydney interests; but as a reply to the "Herald's" accusation that the legislation which formed the Dominion Coal Company was ill-advised. So far as the effect of the Dominion Coal Company upon the other operators of the province is concerned, it cannot be accused of monopoly, of price-cutting, or of squeezing out the little fellow. Actually the Dominion Coal Company has been the "big brother" of the smaller coal companies. It has borne the brunt of evil times, has stabilized the industry, and in many cases has, more than any other factor in the province, made it possible for the little operators to exist at all. The Dominion Coal Company did not at any time unfairly compete with other mines in the province. Instead, it went altogether outside of the province, and developed new avenues of trade. If the Dominion Coal Company has been a monopoly, it has been a very benevolent one; but it never was a monopoly. It has, it is true, exerted a preponderating influence in the provincial coal trade, but its influence has been a stimulating one, nor can its effect on the ethics of the trade and the technical excellence of mining practice be characterized as otherwise than beneficial.



THEO. G. DENIS

The Asbestos Industry

By Jacob A. Jacobs.

The value of asbestos as a material for making incombustible thread, rope and cloth has long been known, but it is only in recent years that extensive use has been made of it. Now the architect, builder, steam-fitter and electrician recognize asbestos as a splendid material for resisting weather, fire, acids and other agencies of destruction, and they use it for very many purposes. The variety of uses is fast increasing and scarcely a month passes without some new application being found. Not many years ago asbestos was a mineralogical curiosity. Now it is a necessary article of commerce.

When asbestos was first discovered in the Eastern Townships of Quebec, over thirty years ago, its uses were so little known that the output of one quarry at Thetford could hardly be marketed to advantage, and the world knew but little of its commercial value. Gradually, however, manufacturers and others have come to realize its importance until now the demand is in excess of the supply.

In the production of asbestos, Canada occupies a leading position, as at least ninety per cent. of the world's supply of that commodity comes from the Serpentine Belt that crosses the Eastern Townships of Quebec, through the counties of Richmond, Wolfe, Megantic and Beauce, and on which are located the asbestos mines of the Danville, Black Lake, Thetford and East Broughton districts.

The mines are worked as open pits, or quarries, the rock being hoisted by means of derricks. Some mines near Thetford have already reached a depth of over 250 feet, with no indication of the pay rock running out.

The separation of asbestos from the hard serpentine in which it occurs is simple and inexpensive in comparison with the extraction of metallic ores.

After the rock is blasted the best of the vein material is extracted by means of hand hammers, and sent to the cobbing sheds to be sorted and cleaned. This is known as Crude, and brings the highest price.

The balance of the rock, classified as Fibre or Mill rock, passes to the crushers, thence to the driers and again through secondary crushers, screens, and pulverizers. From the pulverizers it passes over shaking screens from which the asbestos, now well opened out, is drawn up by vacuum fans and discharged into dusting machines. From there it passes over grading screens into bags and is then ready for market.

The percentage of marketable asbestos from the mill rock will average from 7 to 10 per cent. Of the total tonnage produced, the proportion of Crude asbestos to the whole is from 2 to 4 per cent.

Grades of Asbestos.

Asbestos is considered in two classes: Crude and Fibre.

Crude—Of the Crude Asbestos, the first handpicking is composed of fibres $\frac{3}{4}$ of an inch and over. The second picking, under $\frac{3}{4}$ inch, includes all that can be separated by hand.

Then comes the defiberized, or machine separated asbestos, generally classified as follows:

Fibre and Shingle Stock—Holding the longest fibres, fit for lining but rarely used for weaving except in case of extra quality.

Paper Stock—Containing the short fibres, and used in the manufacture of paper, felts, lumber and many other articles.

Asbestic—Or crushed serpentine rock, which is used in the manufacture of plaster, cement, fire-proof brick, etc.

Canadian asbestos has a density of 2.5; it is white or greenish in color, but the separate fibres are white, lustrous and silky, anywhere from $\frac{1}{4}$ to 3 inches in length. Single threads, or fibres, sometimes attain 5 or 6 inches in length. The veins run irregularly in every direction in the serpentine and extend sometimes a hundred feet or more.

While the Crude, or vein asbestos, is the most valuable by weight, the flaky fibrous substance that impregnates the rock in asbestos deposits is found in much larger quantities than the Crude and makes up the greater part of the production. This is generally known as Fibre, or Mill asbestos.

When asbestos was first mined, only fibres of $\frac{1}{4}$ or $\frac{1}{2}$ inch were utilized; a proportion of 1 to 3 per cent. of useful matter was considered of value, and 3 per cent. was considered a high average. Now that the whole of the fibrous matter is obtained by means of improved machinery, this proportion runs from 6 to 15 per cent. and even more than this is utilized for the manufacturing of asbestos used in building operations.

Production of Asbestos in Quebec.

The production of asbestos in Canada during recent years is shown in the following table. There will probably be an increase in value of 25 per cent. in 1918:

Year	Tons.	Value.
1903	29.261	\$ 916.970
1904	35.479	1,186.970
1905	48.960	1,476.450
1906	61.675	2,143.653
1907	61.985	2,455.919
1908	65.157	2,551.596
1909	63.965	2,296.584
1910	80.605	2,667.829
1911	102.224	3,026.306
1912	111.175	3,059.084
1913	136.609	3,830.504
1914	107.701	2,895.935
1915	113.115	3,544.362
1916	133.339	5,182.905

1917. Considerable increase in value. Figures not completed yet. Estimated\$7,200,000

Uses of Asbestos.

The enumeration of the many uses to which asbestos is now put would make a book. For hundreds of articles for household use, and for the house itself, covered with asbestos slates or shingles, and sheathed and lined with the fire-proof plaster or board, this wonderful material has become indispensable. Some of the uses may be mentioned as follows:

Cloth—Asbestos thread, made from the highest quality of crude, is woven into many kinds of cloth and fabric, from the lighter curtains of filmy lace to the heavy drop curtains for theatres, amusement halls and the like, and for the fire-proofing of the thousands of moving picture shows now being introduced

throughout all civilized countries. Asbestos cloth is also used for clothing for firemen and employees of smelting works, blast and iron works and acid works. There is no material so useful for the safety of life and property as asbestos.

Insulation—Where perfect insulation is required, as in the case of covering for electric wires, no better non-conductor can be found. It is not affected by many of the chemical agents likely to attack most insulations. It also makes the best covering for piping in connection with refrigerating plants, or for steam pipes, boilers and other places where a prevention of radiation or cooling is required, being used in this case as a binder for magnesia coverings.

Paints—Under the name of "Plastic," etc., asbestos is now used in the manufacture of certain paints, the fibrous structure having the property of holding up the heavier pigments in the paint. When used with paint containing lead and zinc it adds certain properties which no other pigments can give.

Paper—Over 90,000 tons of asbestos paper was used last year in building construction. This paper is damp-proof as well as fire-proof and its use is highly recommended by insurance companies.

Plaster—Asbestos, or refuse, when mixed with caustic lime, produces a perfect fire-proof wall plaster for either inside or outside work, and its cheapness will make its use more general as the economical qualities become more known.

Fire-Proof Brick—Composed of hydraulic lime, sand and asbestos. These bricks are now used where high temperatures are required, as in lining for furnaces, fire-boxes, etc. No other material will resist extreme heat so well.

Conveyor Belts—Owing to their fire-proof and wearing qualities, and their recognized superiority to rubber, leather, or canvas. Asbestos conveyor belts are used where hot clinkers and other substances have to be mechanically disposed of. The durability of these belts also commends them in all cases where crushed rock, copper or other ores have to be handled in bulk.

Floorings—Asbestile tiles and boards are used for floorings. They are impervious to heat or water and their elasticity is as high as wood. They have the hardness of cement, greater durability than asphalt, are light in weight, will not crack and are non-conductors of sound.

Household Goods—Asbestos felting is made into many articles for the house, such as: Table covers, stove mats, rugs, gas logs, fibre for grates, etc.

Asbestos Lumber—In modern building constructions, Asbestos wood is now largely used because of its fire-proof and water-proof qualities. It also enters into the making of electrical switch-boards, cut-offs, etc., and in the protection of trolley and electric cars against short circuiting.

Rope—Used in the manufacture of twine, cord and wirecorded rope required by fire departments.

Asbestos fabric has a greater tensile strength than cotton fabric, a statement which is evident when you consider that an asbestos fireproof rope of $\frac{3}{8}$ inch diameter has a tensile strength of 1650 pounds.

The additional mention of automobile brake linings, filters, imitation leather, mattresses for engine lagging, cigar lighters, protected metal, cement, fire-proof linings for stoves and automobile tires, does not nearly complete the list of uses in which asbestos has a part. In fact, it would be difficult to name them all.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Trethewey Co. Will Develop Gowganda Property.

Camps are being erected on the Castle property at Gowganda, and arrangements are being made for an extensive campaign of exploration and development. This property recently passed under control of the Trethewey Mining company, of Cobalt. The mining plant which is to be installed on the property has arrived at Elk Lake and is being transported over the winter roads to the property, a distance of about twenty-five miles. The Castle adjoins the Miller Lake-O'Brien.

Developing Hill Gold Mines Property in Munro.

About thirty men are employed at the property of the Hill Gold Mines, near Painkiller Lake, in Munro Township. The shaft has reached a depth of about 75 ft., and the mineralization of the vein is satisfactory. Camp buildings for the accommodation of about fifty men have been erected, and the work of transporting supplies to the property over the winter road from Matheson is in full swing. Operations will be pushed vigorously at this property from this time forward.

Better Road to Gowganda is Needed.

The rate for the handling of freight from the end of the steel at Elk Lake to Gowganda has recently been increased from 75 cents per cwt. to \$1 per cwt. An urgent plea is being made for a macadamized road to this camp, to be built during the coming summer. The inadequacy of the transportation facilities to this district has always been a retarding factor in the promising district, and anything that is done in the way of relieving this condition is hailed with pleasure by the large number of property owners in the camp. A large number of promising prospects are undergoing more or less development at the present time, and with the added burden of one cent per pound for freight, the results have to be exceptionally promising to induce extensive development.

More Satisfactory Results at Dome Lake Mine.

Developments at the Dome Lake Mine, in Porcupine, are more satisfactory at the present time than for some time past. At the 500-ft. level, in a crosscut, ore of a considerably higher grade than that obtaining in other portions of the mine has been encountered. The development is important, in view of the fact that it has been contended by the management that the geological conditions strongly indicated greater possibilities at depth.

Kirkland Lake Gold Mines, Ltd.

It is rumored that the Mining Corporation of Canada will unite with the Beaver Consolidated Mining company in the development of the Kirkland Lake Gold Mines, Limited. It is stated that preliminary negotiations have already been begun and that the chances of them being successfully consummated are exceedingly bright.

Development of Burnside Property Begun.

Work has commenced on the Burnside property, at Kirkland Lake, which is under option to the Cobalt-Aladdin Mining company. The connections with the Sylvanite plant, which is to be used in the development of the Burnside, were completed about two weeks ago. A new shaft is to be sunk on a vein a short distance west of the old number one shaft. This working will be driven to a depth of 155 ft. at which point a cross

cut will be run north to the boundary of the Tough-Oakes, where the No. 1 vein of the latter property is expected to be picked up. The old No. 1 shaft will also be driven to deeper levels, and the ultimate plan of the management is to connect these two shafts at the depth of 155 ft. There are fourteen known veins outcropping on the surface of the Burnside in a number of which high gold values occur. Geological conditions on the Burnside are identical with those prevailing on the Tough-Oakes, and the opening up of the neighbor of the pioneer mine of the district will prove an interesting step in the development of the Kirkland Lake camp.

Elliot-Kirkland Vein Cut at 425 Ft.

The crosscut at the 425-foot level of the Elliot-Kirkland mine has cut the downward continuation of the vein. At the point where encountered, the vein was found to be about twenty-eight feet in width. While results of the values encountered have not been given out as yet, the vein is well mineralized, the composition being similar to that encountered in the crosscut at the 300-ft. level.

Planning Railroad for Kirkland Lake.

A conference of the mine managers of the Kirkland Lake camp and officials of the T. & N. O. Railway was recently held with a view to determining the ultimate location of the branch of the railway which it is anticipated will be constructed when conditions become more favorable. The idea in view by the mine managers was to enable them to construct their plants in such a manner as to make as few changes as possible necessary when the spur line is completed.

Cobalt Silver Output Continues Large.

The daily production of silver in the Cobalt camp is being maintained at a rate of approximately 53,350 ounces per day, or 1,500,000 ounces per month. At this rate, with the prevailing price for the white metal, the value of the product bids fair to exceed in value the output of any previous year in the history of the camp.

Nipissing.

During the month of January, the Nipissing mining company, Cobalt, produced ore of an estimated net value of \$307,019, and made shipments from Nipissing and customs ore of net value of \$310,881. Operations underground were of a similar nature to the previous month. No new veins were found, but most of the month's development work continued to be satisfactory. Part of the month's production came from shaft No. 63, on the property which has recently been placed in working order. Exploration in new areas will be carried on from this shaft. A diamond drill was in operation during most of the month on claim R.L. 407, the work being done mainly to determine formations. Further work has been planned in other sections of the property which will keep this drill busy most of the winter. Both high and low grade mills occupied part of the month in making their annual clean-ups, but are now treating 1918 production. During the month of January, the high-grade mill treated 53 tons and shipped 348,954 fine ounces of silver. The low-grade mill treated 6,396 tons. The value of the production for the month was as follows: Washing plant, \$178,404; low-grade mill, \$128,615.

Dome Mines.

Operations at the Dome Mines have been resumed on a small scale. The work being done at the present time is the driving of the main shaft from the 800-ft. level to a depth of 1000 ft. It is reported this working

will ultimately be carried to the 1500-ft. level. When the desired depth is reached, an extensive exploration programme will be undertaken. Should ore be opened up as indicated by diamond drill cores, development work on a large scale can then be gone ahead with. The 35-ft. sump below the 800-ft. level has already been timbered and sinking is now under way. The work is being done by the company itself, and not by a firm of contractors, as reported.

Peterson Lake Will Instal Oil Flotation Plant.

Plans have been completed for the installation of the oil flotation plant at the Peterson Lake Mining company's property, at Cobalt. The treatment of the tailings from the operations of the Seneca Superior mine, it is estimated, will give the company a net profit of \$30,000. The cost of installation of the plant is expected to be in the neighborhood of \$15,000.

Temiskaming.

One of the first changes at the Temiskaming Mine, as a result of the switching of control, is that the resident manager, Mr. J. W. Moffet, will be replaced by Mr. McReavy, manager of the Trethewey Mine. Mr. Moffet is also manager of the Beaver.

Alexo Make Large Output of Nickel Ore.

During the month of January, the Alexo Nickel mine, at Porquis Junction, about thirty miles east from Porcupine, and within a mile or so of the T. & N. O. Railway, shipped 21 cars containing 1,625,700 pounds of ore to the Mond Nickel company, at Coniston. This is by far the heaviest month's shipments in the history of the company, being over 400,000 heavier than the previous record month, which was October, 1917. During the past nine months the company has shipped 115 cars of ore containing approximately 9,642,200 pounds.

Davidson.

The management of the Davidson mining company, at Porcupine, expect to have their sixty-ton mill in operation by the end of the present month. The financial statement covering a period of seventeen months, ending December 31st, 1917, shows that over \$83,000 was expended in development work. Plant and machinery were valued at \$39,982, and the buildings \$19,000. The company is clear of debt. Developments during the seventeen months comprised 3,096 feet, of which 1,330 ft. was cross-cutting, 1,094 ft. drifting, 395 ft. raising and 277 ft. sinking. Diamond drilling comprised 2,115 ft., and surface work 15,885 ft. It is estimated the company have about 100,000 tons of ore of a satisfactory average value.

Porcupine Crown.

There is a growing belief in the Porcupine camp that further curtailment in the operations at the Porcupine Crown will soon be deemed advisable. The high rate of wages being paid at the Hollinger and McIntyre Porcupine Mines, it is contended, is absorbing the larger portion of the available supply of workmen. The two latter mines, owing to their physical condition, can afford to pay a higher rate of wages than many others in a less fortunate position, and in some instances wages amount to as much as eight dollars per day. This forms an economic barrier to a like policy at mines like Porcupine Crown.

Schumacher.

Mr. A. S. Wookey, manager of the Schumacher mine, Porcupine, having enlisted, the management of this property is now in the hands of Mr. T. J. Harwood, who for ten years was manager of the LaRose Mine, at Cobalt, and is well known throughout the North

Country through his connection with this mine. For about three years, Mr. Wookey has managed the Schumacher, and under his supervision the mine has developed from a prospect to a thorough-going mine with large ore reserves, a large, up-to-date mill, and with a future only second to the Hollinger, Dome and McIntyre. The milling record of the mine is second to none in the country and has resulted in a substantial margin of profit being realized in spite of the burdens of war. During the past few months the mill has been treating around 180 tons of ore per day, the profits of which have been sufficient to carry on extensive underground operations. The management decided, several months ago, to continue the main workings of the mine to the 1000-ft. level, but the mill construction during the past summer, together with the shortage of labor, have deferred this plan. Whether or not the new management will follow out this plan of operations has not yet been announced. In Mr. Wookey, the Porcupine camp is losing, temporarily, one of its most efficient mine managers.

Kirkland Lake.

A small part of the machinery for the new mill to be installed at the Kirkland Lake Gold has arrived, but at the present time operations at the property are at a standstill, and up until the present time nothing definite has been given out as to when a resumption of operations can be expected. This property belongs to the Beaver mining company, of Cobalt, and is considered to have exceptional merit. The main shaft has reached a depth of 700 ft., and where the ore body was cut at this point, the values were found to compare favorably with those of other levels of the mine. Considerable lateral work has been done on a number of levels above the 700 ft., with highly satisfactory results.

Wright-Hargraves Cuts Orebody at 200 Ft.

According to latest advice received from the Wright-Hargraves mine, at Kirkland Lake, the main orebody had been encountered at a depth of two hundred feet in the number three shaft. The orebody was found to be sixteen feet in width, the mineralization of the vein being very similar to that found at other points on the property. The number three shaft will be continued to a depth of 300 ft., after which it is planned to drift east to connect up with the number two or main working at that level, a distance of nine hundred feet. Until such time as this is accomplished it will be difficult to estimate the ore reserves of the mine. However, a large portion of the ore already encountered runs over \$20 to the ton, and a considerable quantity is said to carry values of over \$50 to the ton, which makes the outlook exceedingly good. Within the next few months the management should be able to intelligently estimate the ore blocked out and there would appear to be every reason to believe that the total will be well up in seven figures. This property is rapidly developing into one of the leading mines of the Kirkland Lake district.

McIntyre.

One of the outstanding features of the report of the McIntyre-Porcupine Mines for the period covering the last half of the year 1917, is the large amount of development work done. During this six-months' period nearly three-quarters of a mile of underground work was done. Increased production was also shown in the report, but at the same time increased costs held

the profits below the previous six-months by some \$7,000. The development work was stated to be satisfactory. In connection with the Plenaurum property, it is announced that the option has been extended to Dec. 31st, 1918. The Jupiter shaft has been completed to the 1000-ft. level, and a station is now being cut at this point. When this work is completed, a drift will be started east to explore the plenaurum and the eastern portion of the Jupiter. The total footage of underground work accomplished during the last half of the year was 3,796. In addition to this, 2,739 ft. of diamond drilling was done. Development work throughout the property continued highly satisfactory. Drift No. 1026, on the 1000-ft. level of the main shaft, has penetrated the Jupiter claim for a distance of 600 ft. Owing to this drift being the main haulage way for ore coming from the Jupiter claims, it has been taken off the vein and is being driven through the quartz-porphyry to make a direct connection with the Jupiter shaft. The territory lying to the north is being explored by diamond drill from this drift. Preparations are under way to sink the main shaft to a depth of 1,300 ft.

Hollinger.

The annual report of the Hollinger Consolidated Mines, of Porcupine, issued early this month, should prove pleasing to the shareholders of the company, particularly the statement made by the President, Mr. N. A. Timmins, that: "If labor conditions become no worse, an early resumption of dividends may be expected." Although holders of the stock did not receive much in dividends during the year just passed, it is gratifying to note that the ore reserves of the mine have increased from \$34,185,000 to \$40,231,000, or an increase of forty per cent. on the authorized capital of the company. Besides this, since the time of discontinuing the dividends a deficit of \$269,590, which stood on the books at the beginning of 1917, has been wiped out and a surplus of \$713,734 has been added. The expenditures for plant amounted to \$673,000, and \$131,224 was charged to capital development, with \$100,000 written off for plant depreciation. During the year just closed the company exposed \$10,300,000 in new ore. The estimate of the ore reserves was based on the territory above the 800-ft. level, while the president intimates that the ground below that level, being unexplored virgin territory, has enormous speculative value.

A portion of the new milling equipment is being tried out at the mine, and one unit of twenty stamps has already been tested and found to be operating satisfactorily. The plan adopted is to try one section at a time, and as one section of the new mill is found satisfactory, another is brought into play, and this will be continued until such time as new installation, with a capacity of one thousand tons per day, is brought into play. However, owing to the scarcity of labor as each section of the new mill is brought into use, a similar portion of the old mill is closed down, thus it will be seen that it is not certain that production will be greatly increased until such time as efficient labor becomes more plentiful. Wherever practicable, either on surface or underground, most modern equipment is being installed tending toward greater speed with smaller working forces. Thus, the Hollinger should be able to continue a very large output, despite the hardships of a prolonged war.

BRITISH COLUMBIA.

In the course of his address to the Legislative Assembly of British Columbia, when opening the Provincial Parliament, last month, His Honor the Lieutenant-Governor made the following references to matters relating to the mining industry:

"Owing to the existing conditions under which the precious and base metals in the Esquimalt and Nanaimo Railway belt, Vancouver Island, are held jointly by the railway company and the Province, you will be asked to consider the situation, to the end that the area involved may be given more attention by prospectors and investors.

"The disabilities against the acquisition of mineral claims under the mining laws of the Province now existing in Strathcona Park, Vancouver Island, will be removed, subject to restrictions as to the acquisition of surface and timber rights.

"My Government is securing the services of an expert to advise on the electro-thermic treatment of iron ores, and measures for the encouragement of iron and steel industries will be presented for your consideration."

Plans for Steel Works.—A press despatch from Vancouver, published in Victoria, reads as follows: "Mr. H. R. Tudhope, a member of the Orillia manufacturing firm which is behind the proposal to establish an electric smelting and steel-plate mill in Vancouver, accompanied by Mr. W. L. Renton, general manager of the Pacific Steel Co., and former vice-president and manager of the Electric Steel and Metals Co., of Welland, have returned to Vancouver from Victoria, where they had a lengthy session with Premier Brewster, Hon. J. W. de B. Farris, K.C., and Hon. William Sloan, Minister of Mines.

"Hon. Mr. Sloan expects to name within the next day or two the metallurgical expert who is to give an independent opinion upon the various questions involved in the proposals for establishing an electrical smelter and steel-plate mill. In the meantime, it is said, the representatives of the steel interests discussed with the members of the Cabinet most interested in the proposal many of the features and problems in connection with the proposal, and were accorded a friendly and sympathetic hearing.

"The Tudhope interests are behind both the Pacific Steel Company at Eburne and the Aetna Steel Works at Port Moody, both of which plants are now undergoing change from oil-burning furnaces to electrical furnaces and other improvements to increase their production of steel fivefold. Pending the opening of iron ore deposits which the new furnaces being installed are said to be capable of handling, the two plants are working on scrap material, which is melted and rolled into rods, angle irons and other forms of iron and steel needed in ship work."

Vancouver Island Moves, Too.—Public bodies on Vancouver Island are also active, in efforts to secure the establishment of an iron and steel industry on the Island. A representative Central Iron Committee has been formed and a numerous delegation from it has waited on the Provincial Minister of Mines with the object of ascertaining what action the Provincial Government proposes to take with respect to utilizing the iron ore deposits of the Province. This committee has formulated proposals which are, briefly, to ask the Provincial Government to immediately proceed with the selection of a fully qualified iron expert and metallurgist to examine and report on the iron ore de-

posits of Vancouver Island and the adjacent islands as well as the necessary elements required for the production from those deposits of pig iron, and to appropriate the necessary money for the carrying on of these experiments, such experts to be independent and not associated directly or indirectly with any corporation or person connected with the iron and steel industry; that the Government immediately place a reserve on all unstaked iron lands on Vancouver Island or adjacent islands; that power be given the Minister of Mines to take steps to operate these iron mine claims and that the Government restrict the exportation of raw iron ores similar to the way the exportation of timber from the Province is now being restrained.

It is considered by the committee that the first logical step in their undertaking is to secure to the Province its resources by means of amending legislation which the local Government will be urged to bring down in course of the present session of the Legislature. The object of this is to forestall the stealing away of the iron resources through purchase by agents of existing corporations, to whom an industry of the proportions desired here would eventually become a competing factor. Being able thus to guarantee an unrestricted supply of raw material, the committee proposes to approach the Dominion Government for aid to development by way of a bonus, or such assistance as may seem advisable, as a war measure.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 17 cents per lb.

Feb. 26, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 11 cents per lb.
Lead, 9 cents per lb.
Tin, 88 cents per lb.
Antimony, 17 cents per lb.
Copper, casting, 31 cents per lb.
Electrolytic, 32 cents per lb.
Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Feb. 26, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York cents.	London pence.
Feb. 14	85½	42¾
Feb. 15	85½	42¾
Feb. 16	85½	42¾
Feb. 18	85½	42¾
Feb. 19	85½	42¾
Feb. 20	85½	42¾
Feb. 21	85½	42¾

NEW YORK MARKETS.

Connellsville Coke—

Furnace, \$6.00.

Foundry, \$7.00.

Crushed, over 1-inch:

Beehive, \$7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

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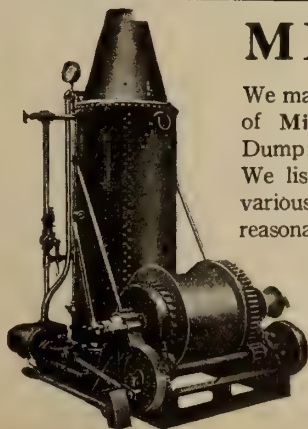
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 nominal, 27.00.
 Brass Products—Base prices.
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 Sheets and wire, 26.75 to 27.50.
 Rods, 24.75 to 26.75.
 Low brass—
 Sheets and wire, 30.00 to 32.00.
 Rods, 30.75 to 32.75.
 Brazed tubing—
 Brass, 34.75 to 36.75.
 Bronze, 39.75 to 41.75.
 Seamless tubing—Base prices.
 Brass, 35.50 to 37.50.
 Copper, 38.00 to 40.00.
 Bronze, 42.50 to 43.50.
 Full lead sheets, 9.25.
 Cut lead sheets, 9.50.
 Sheet zinc, f.o.b. smelter, 15.00.

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange, Feb. 25, 1918:

Gold.		Bid.	Asked.
Apex .....		.047½	.05¼
Boston Creek .....		..	..
Dome Extension .....		.09¾	.10½
Dome Lake .....		.26	.27
Dome Mines		8.50	8.75
Imperial .....		.017½	.02¼
McIntyre		1.40	1.41
Hollinger		4.95	5.00
New Ray .....		.21	.21½
Porcupine Crown .....		.17½	.20
Vipond .....		.22	.25
Preston East Dome .....		.03¾	.03¾
Teck-Hughes .....		.50	.51
West Dome .....		.11¼	.11¾
Silver.		Bid.	Asked.
Adanac .....		.09	.10
Bailey .....		.04	.05
Beaver .....		.24½	.26
Buffalo .....		..	..
Ferland .....		..	.10½
Coniagas		3.15	..
Crown Reserve .....		.21	.25
Gifford .....		.03¼	.03¾
Great Northern .....		.03½	.04
Hargraves .....		.06¾	.06¾
Hudson Bay .....		..	37.00
Kerr Lake		5.45	5.70
La Rose .....		.31	.36
McKinley .....		.51	.52
Nipissing		8.35	8.40
Peterson Lake .....		.09¼	.10
Right of Way .....		.03½	.03¾
Seneca Superior .....		..	.01½
Temiskaming .....		.28	.28¾
Trethewey15¼	.15¾
Wettlaufer05½	.06½
Provincial50¾	.51½
Mining Corporation		3.70	3.80

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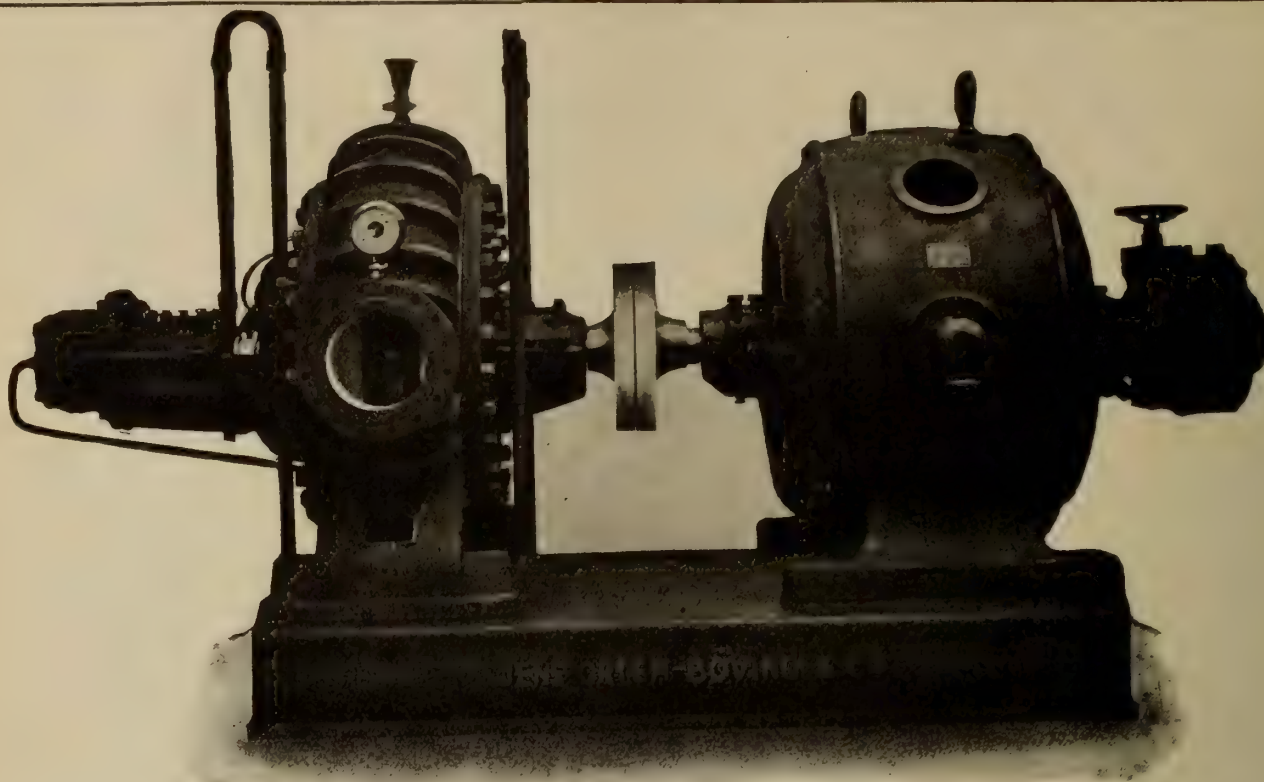
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Pursuant to Power Commission Act, 6 Geo. V., Chapter 19, Section 37, 1916, and amendments thereto, and the Rules and Regulations of the Hydro-Electric Power Commission covering the design and construction of electrical machinery, apparatus, appliances, devices, material and equipment for use in the generation, transmission, distribution or use of electric power or energy in the Province of Ontario, in connection with any electrical installation or wiring for electric light, heat or power, where the electric pressure delivered to or from the same exceeds 10 volts, manufacturers of, jobbers, agents and dealers in electrical machinery, apparatus, appliances, devices, material and equipment, and others interested are hereby notified that the Commission orders that on and after three months from date of this notice no such electrical machinery, apparatus, appliances, devices, material or equipment used, or to be used, as above may be used or disposed of in the Province of Ontario unless and until the design and construction of same has been submitted to the Hydro-Electric Power Commission of Ontario, and approval of such has formally been obtained.

By order,

The Hydro-Electric Power Commission of Ontario

Toronto, December 26, 1917.

W. W. POPE, Secretary

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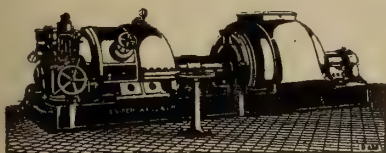
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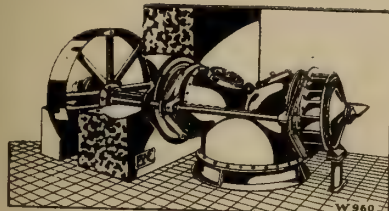
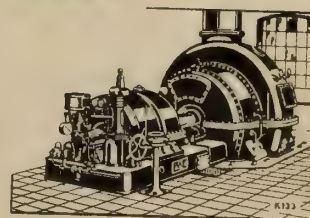
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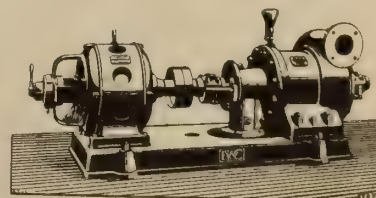
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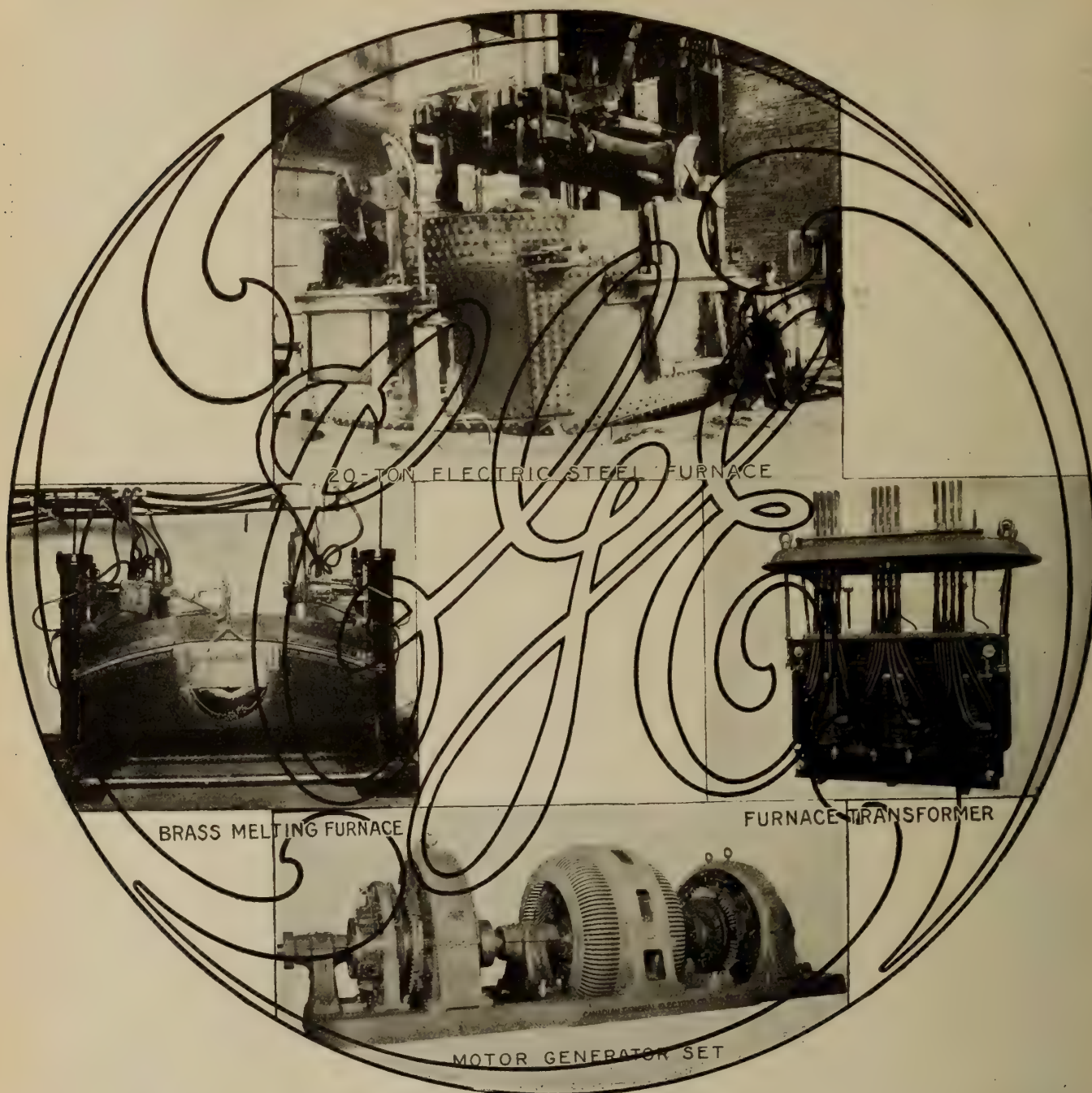
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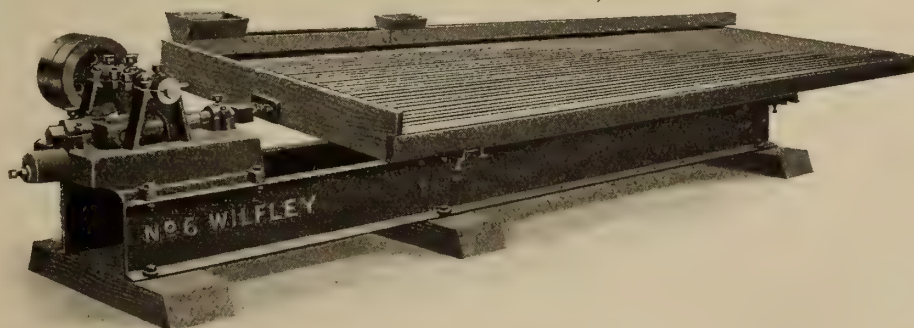
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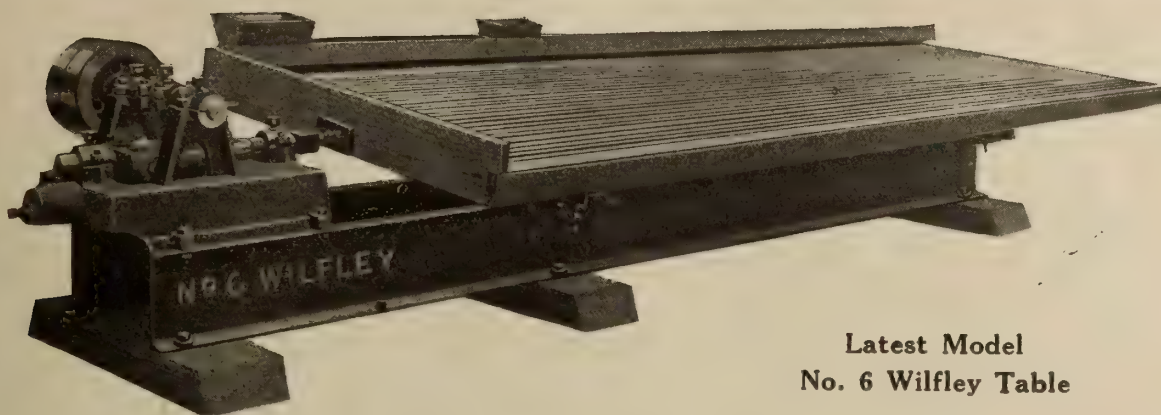
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Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
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- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
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- Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

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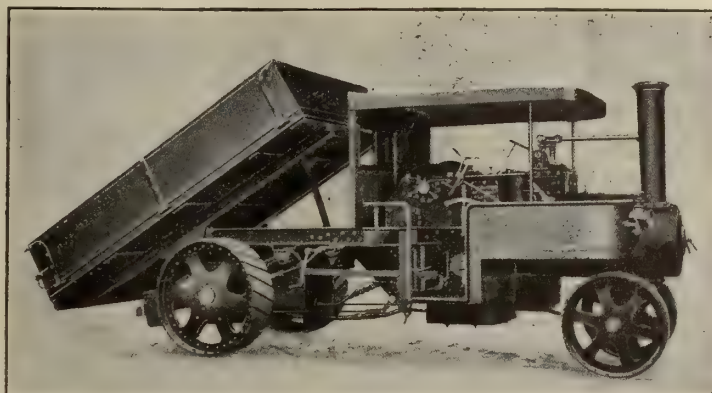
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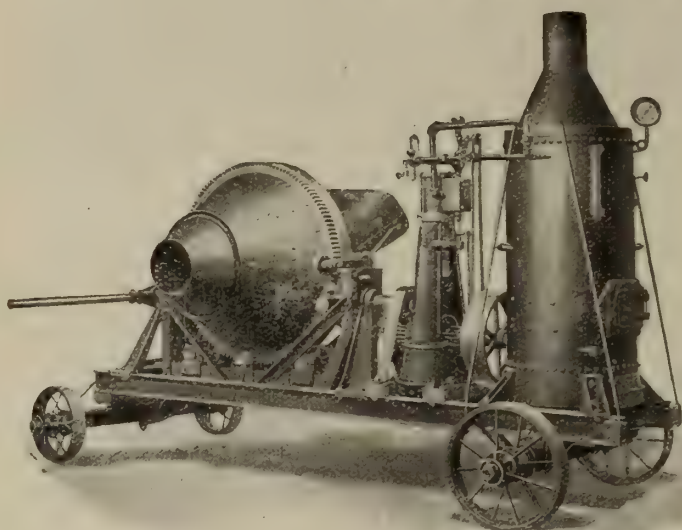
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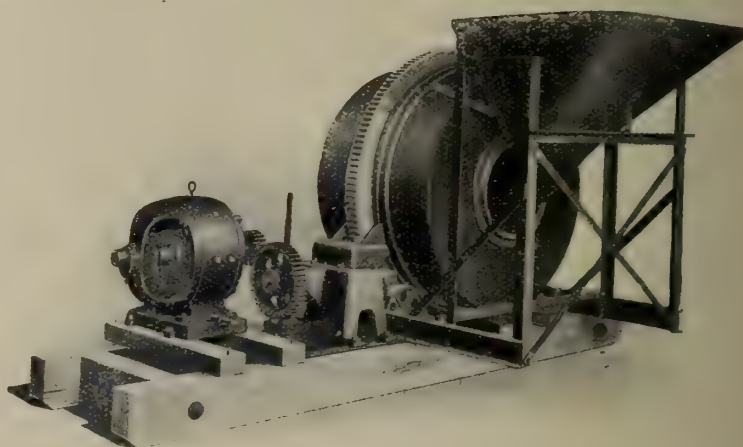
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Pumps—Boiler Feed— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Roofing— Can. Fairbanks-Morse Co. Northern Canada Supply Co.	Sheet Lead— Canada Metal Co., Ltd.	Transformers— Can. Gen. Electric Co., Ltd.
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Pumps—Electric— Can. Fairbanks-Morse Co.	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	Shovels—Steam— M. Beatty & Sons.	Twist Drills—High Speed— Can. B. K. Morton Co.
		Smoke Stacks— Can. Allis-Chalmers, Ltd. Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd. Marsh Engineering Works.	Valves— Can. Fairbanks-Morse Co.
		Steel Barrels— Smart-Turner Machine Co.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd. Marsh Engineering Works.
		Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		Steel Drums— Smart-Turner Machine Co.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
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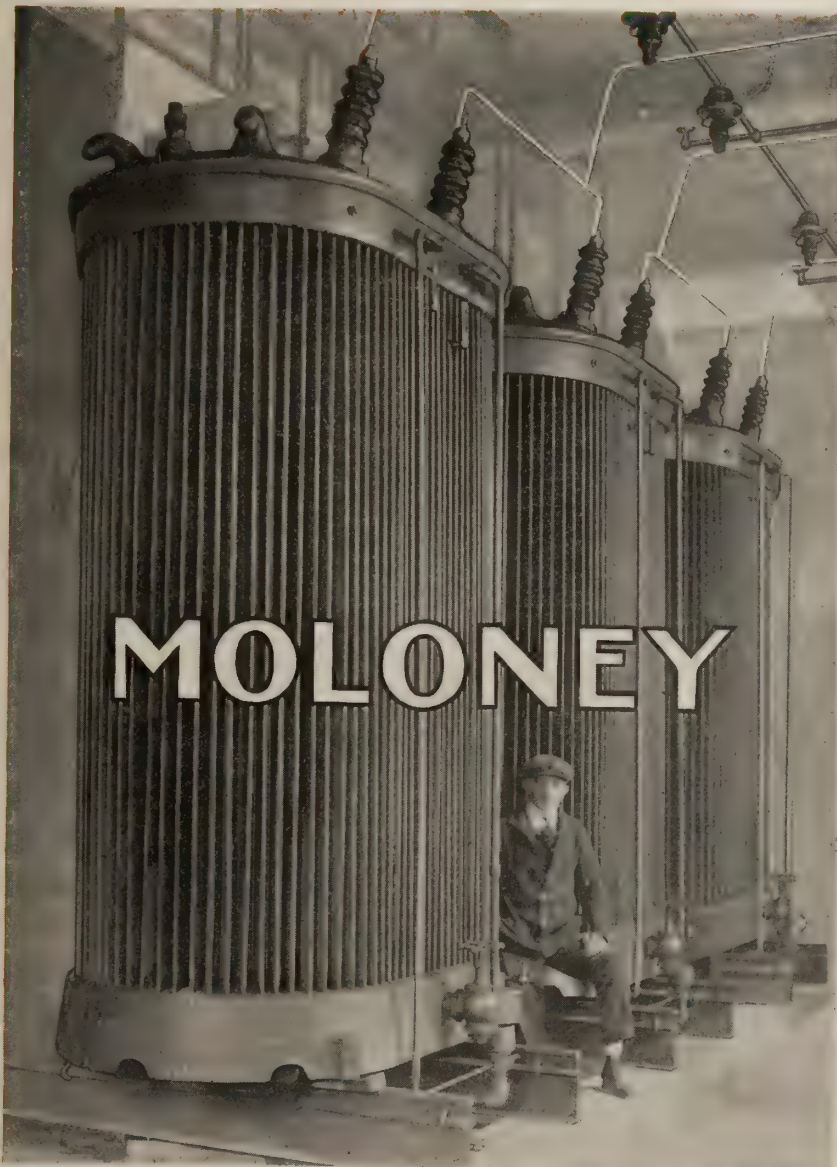
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TORONTO

No. 6



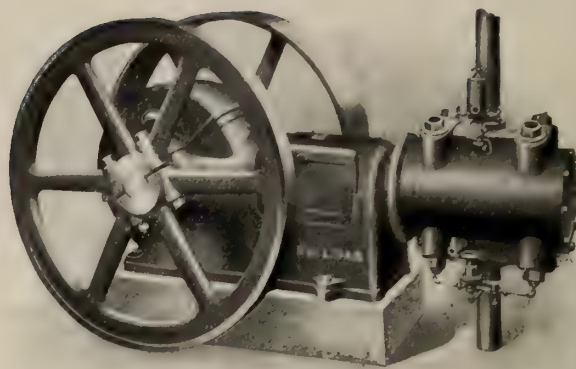
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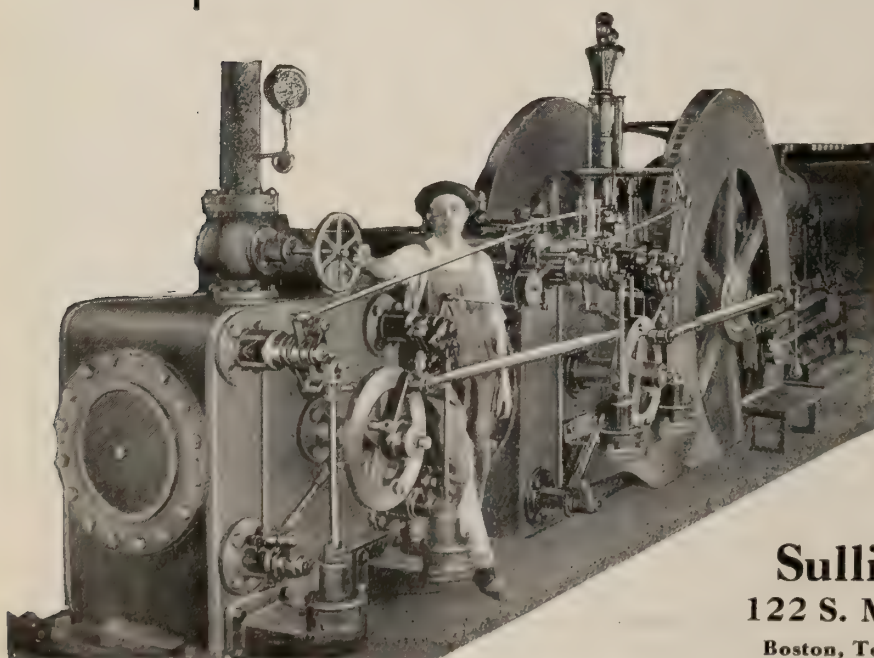
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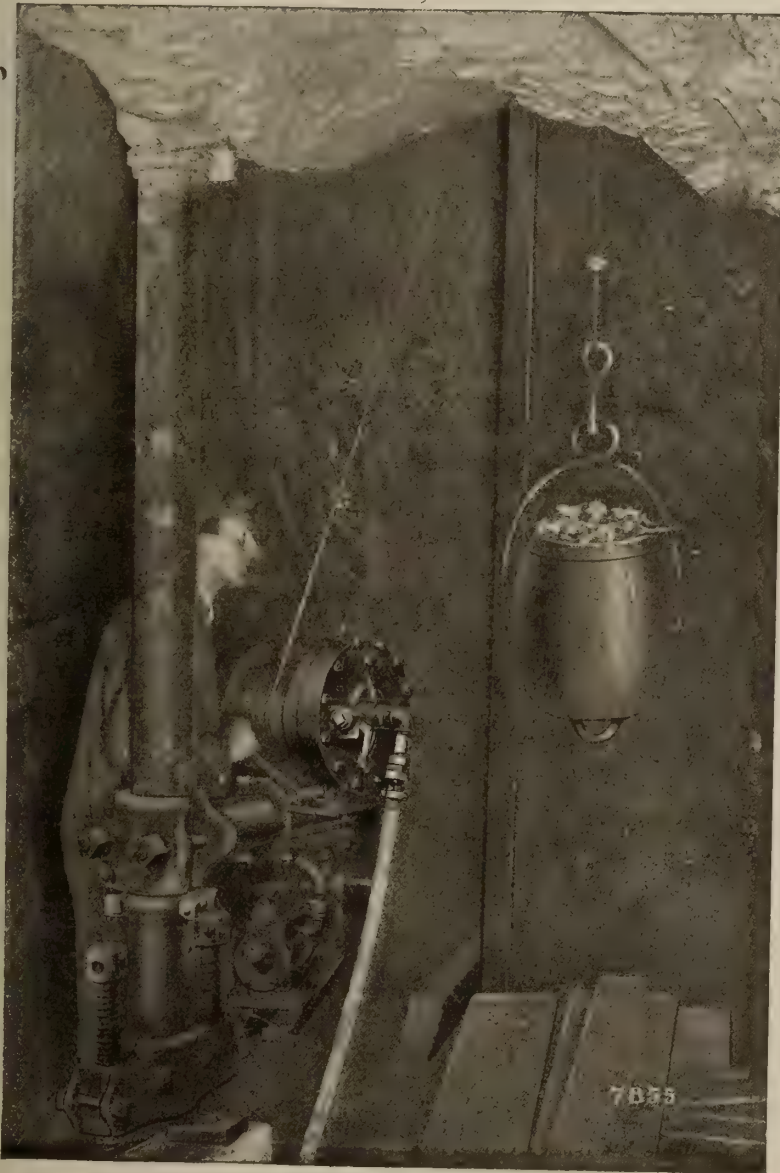
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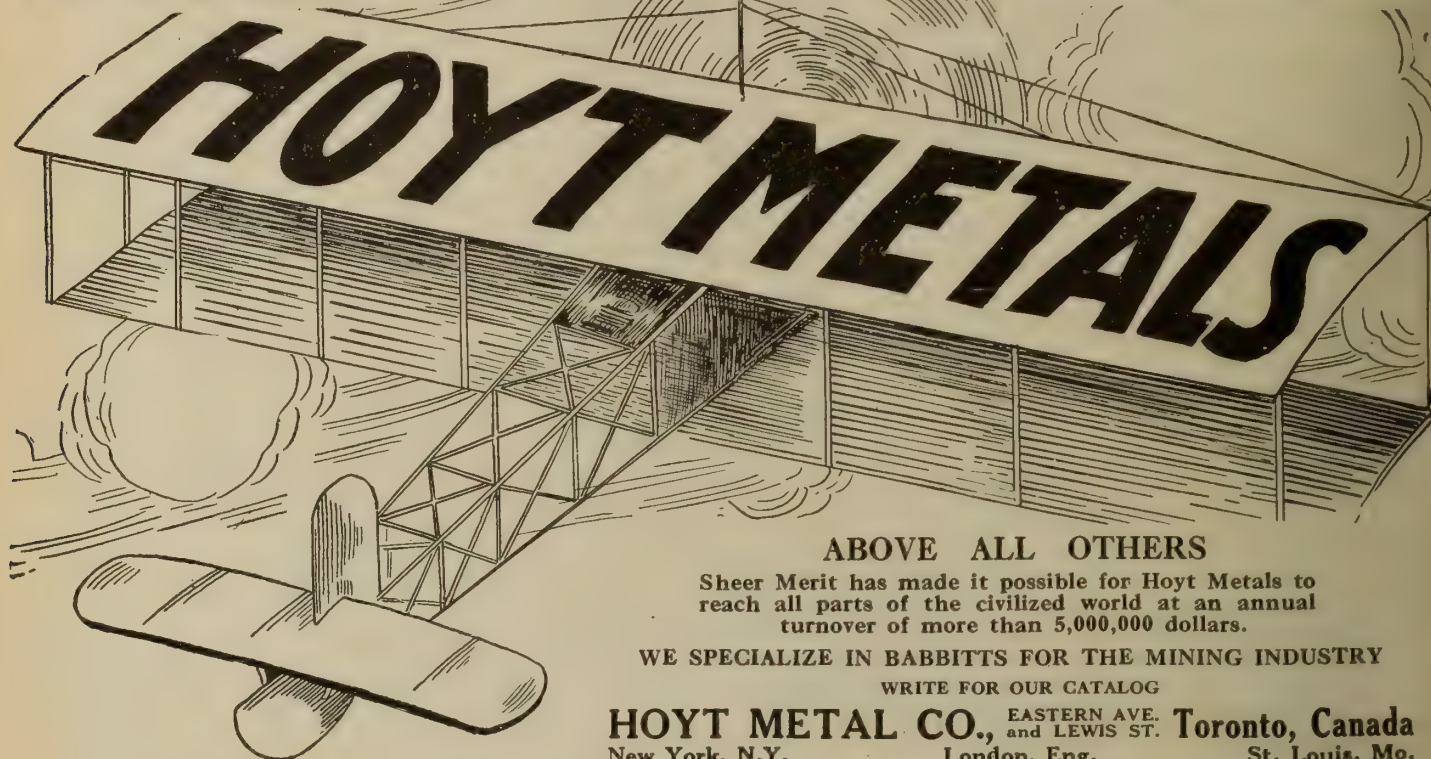
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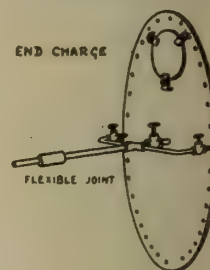
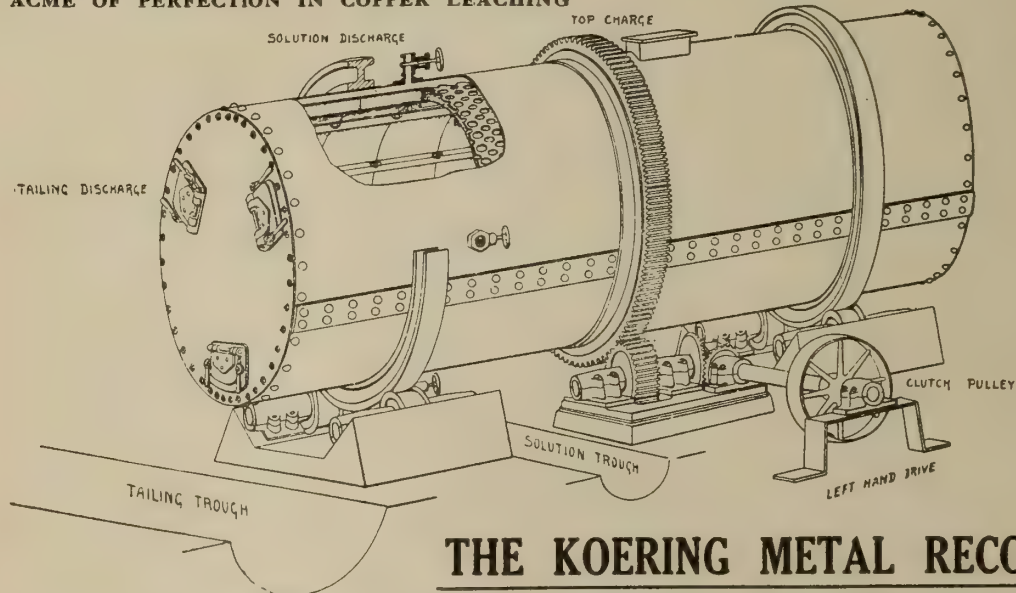
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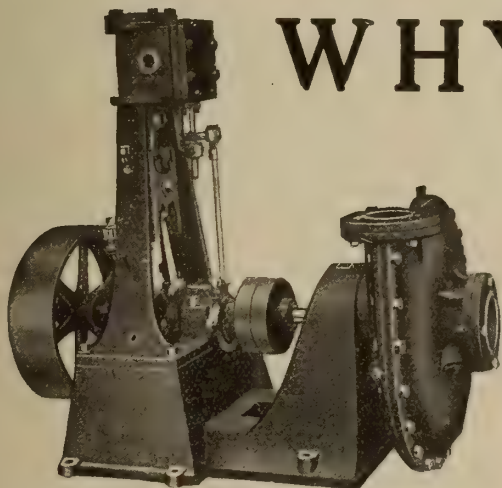
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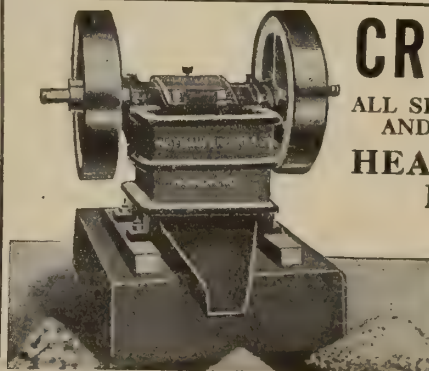
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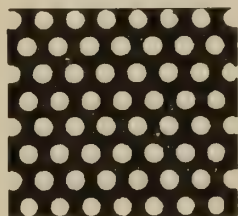
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Department of Colonization, Mines and Fisheries

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WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

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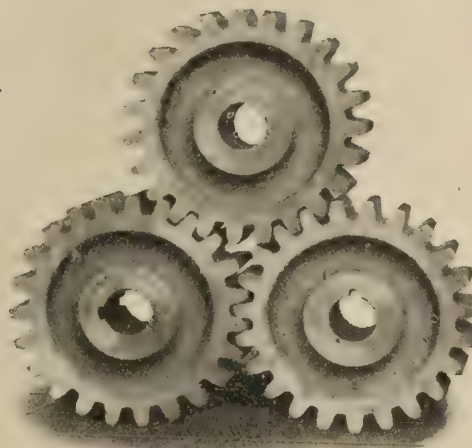
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1916-17

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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, March 15th, 1918.

No. 6

The Canadian Mining Journal

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"CANADIAN MINING REVIEW"

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"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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In our March 1st issue we published three articles by officers of the Department of Mines, which help to show some of the lines along which much progress has been made recently. The summary of the preliminary report on production, prepared by the Division of Mineral Resources and Statistics, of which Mr. John McLeish is chief, is continued in this issue. The article by Mr. M. E. Wilson, of the Geological Survey, gives some idea of the character of the great molybdenite deposit developed at Quyon, Quebec. The article by Mr. Howells Frechett of the Mines Branch contains much useful information on the development of the magnesite industry in Canada. The credit for the preparation of these articles belongs to the Mines Department.

ONTARIO'S PLATINUM AND PALLADIUM.

The scarcity of palladium and platinum and the high price that can be obtained for these metals should draw more attention to the fact that we are not making proper use of the considerable quantities of these metals contained in the ores mined and smelted in the Sudbury district.

It is well known that the Sudbury nickel-copper mattes contain important quantities of the precious metals: gold, silver, platinum and palladium. The report of the Ontario Nickel Commission shows clearly that a large percentage of these metals is being wasted. The magnitude of the waste is, however, not commonly appreciated.

From the publications of the Ontario Bureau of Mines we know that there was produced in Ontario in 1916 80,010 tons nickel-copper matte. This matte contained at least 20,000 and possibly 30,000 oz. of platinum and palladium. In 1917 the production was 78,897 tons of matte. During the past two years, therefore, there has been produced in Ontario matte containing a very large amount of these precious metals. The exact amount is unknown to us; but 50,000 oz. for the two years is, perhaps a conservative estimate. Assuming \$100 per ounce as the value of these precious metals, we have the handsome amount of \$5,000,000 as the value of the platinum and palladium contained in ore mined in Ontario in the past two years.

Why does Canada get no credit as producer of the precious metals recovered from the mattes? How much is being recovered from the mattes in other countries and how much is being wasted? We have not the data necessary for the preparation of a reliable estimate; but we would not be surprised to learn that Ontario platinum and palladium wasted in the past two years amounted to over \$3,000,000.

In this connection the following paragraph from the report of the Ontario Nickel Commission is interesting: "The nickel-copper ores of Sudbury are capable of producing much more palladium than the whole of the present world's supply, together with a very large proportion of platinum, iridium and other metals of the platinum group." How much is being produced from Sudbury ores?

"Iron and Steel," a new journal, devoted to the steel and iron industry of Canada, is now being published by the Industrial and Educational Press, Montreal. The first two numbers contain much useful information and the journal merits a wide circulation among those interested in iron and steel production and manufacture. Mr. Alfred Stansfield is editor-in-chief and Mr. W. G. Dauncey is associate editor. Mr. Stansfield is secretary of the newly formed Iron and Steel Section of the Canadian Mining Institute.

The election of Mr. D. B. Dowling as president of the Canadian Mining Institute should result in increased activity in Institute affairs in the branches in coal mining districts. Mr. Dowling was nominated by members of the Rocky Mountain branch, and, as his headquarters are at Ottawa, the West will have the advantage of a representative in the East at all important Council meetings. Mr. Dowling is one of the senior officers of the Geological Survey and is, of course, familiar with the varied problems that the Institute has to deal with. His peculiar position as a link between East and West is one which suggests a special field of usefulness, and one which he can be counted upon to develop in the best interests of the Institute.

CORRESPONDENCE.

Bore-Hole Exploration.

Editor, Canadian Mining Journal:

Sir,—In your issue of January 15th, under the heading, "Bore-Hole Exploration," I note the statement that "the Knight and Stone double tube core barrel is considered the best double tube core barrel on the market." To experienced drill operators and those familiar with the various types of core barrels, it is unnecessary to comment on this statement, but as the article apparently was intended for general information on an interesting subject, a brief description of the types of double tube core barrels and their advantages may be of interest.

The so-called "Knight and Stone Core Barrel" is a modification of the old rigid type core barrel, which barrel consists of an outer and inner tube, rigidly connected, so that both turn together. The advantage of this type over the single tube is that the water passes between the two barrels and reduces washing of soft core to a minimum. The modification to this barrel mentioned is in a provision for returning part of the water through the inner tube and out into the hole at the top of the core barrel. The advantage claimed for this barrel is that the upward motion of water in the inner tube tends to lift the core. The theory is that if water passing down through a single tube barrel washes core out, then an upward stream should wash it in. In practice, the important thing is to reduce the washing to a minimum, so that when soft, decomposed or friable material is encountered, the flowing water in the inner tube defeats the very purpose of the double tube barrel, namely, to prevent washing. In gravel or material of similar nature, there is some advantage in this type of barrel, but for the ordinary soft ore, for which a double tube barrel is generally used, the old rigid type is preferable.

When it is desired to get accurate records in soft or friable material, such as clay, salt, soft ores, decomposed material or coal, or where it is important even in hard, solid formation, to get the maximum amount of ore, the standard Sullivan double tube core barrel, ball-bearing type, is by far the most reliable barrel. This barrel is more elaborate and expensive than either of the barrels referred to. It is so designed that the inner tube is suspended from ball bearings at the top and does not rotate with the outer tube.

That is to say, the outer tube, to which is attached the bit, does the cutting, and the inner tube passes over the core without friction or vibration and protects the core entirely from the washing effect that is objectionable in the single tube or rigid tube core barrel. No more convincing proof of the superiority of the ball-bearing type can be given than the fact that in drilling coal, which is one of the most difficult materials to core, the Sullivan barrel is in universal use.

I am sending you a cut of the ball-bearing core barrel, which I happen to have, and this will show clearly its construction. I regret that I do not have a cut of the rigid type, but, as stated, it simply consists of two barrels that are rigidly connected and turned together. In appearance, as far as the cut goes, they are very similar, but it will be readily understood that there is quite a difference in the action of these two barrels.

I have been in charge of drilling operations in various parts of the world for the past twenty-five years and I do not hesitate to say that where accurate records are desired, the double tube ball-bearing type core barrel is far superior to anything I have ever seen.

Yours, etc.,

E. J. HARRINGTON.

Flower Station, Ont., Feb. 25, 1918.

Composition of Natural Gas.

Editor, Canadian Mining Journal:

Sir,—Some little time ago there was an interesting correspondence with regard to the composition of natural gas, and probably, therefore, the following particulars in reference to something quite unusual may be of interest to your readers. The full text will be found in the 1918 Year Book and Souvenir Programme of the Spokane Mining Convention, on page 87:

"Natural gas and oil fields have not been developed to any extent in the Pacific North West, but there are indications of both oil and gas. . . . In at least one district natural gas has been found in quantities that suggest important possibilities, and the probability, also, of oil deposits of value. This district is Benton County, Washington, near the centre of the State. The Spokane—Benton Natural Gas Co. are the operators, and they propose to pipe the gas to Spokane, a distance of 120 miles. One well is producing one million cubic feet of gas per diem from a depth of 706 ft. A pond of water on the anticline keeps at one level all the time and has a scum of petroleum oil always showing on the surface.

"The analysis of the gas is the remarkable point, this analysis gave: methane, 76.6 per cent.; ethane, 12 per cent.; propane, 7.20 per cent.; butane, 8.80 per cent., and 0.40 per cent. of oxygen."

It may be remembered that in the writer's previous communication on this subject he referred to the occurrence of other gases than methane, and also of hydrogen. He is satisfied that if other gas well products were examined and reported on, we might have very valuable information in regard thereto.

The writer also thinks that the gas above reported on was probably a wet gas.

Yours, etc.,

JAMES ASHWORTH.

921 Drake St., Vancouver, B.C., Feb. 22, 1918.

Annual Meeting of the Canadian Mining Institute

The meeting of the Canadian Mining Institute, held in Montreal on March 6th, 7th and 8th, was a very successful one. The program proved interesting, large questions being dealt with in an able manner by those who undertook the preparation of papers on matters of national importance. Spirited discussion was aroused by some of the papers on fuels and the Friday morning session was enlivened by a spirited defence of the Commission of Conservation.

Iron and Steel Section Formed.

An event that may prove to be of great importance to the Institute was the foundation of a Section on Iron and Steel. Numerous representatives from the iron and steel industry attended the meeting and decided in favor of the suggestion that they should organize in the interests of the industry and that the Canadian Mining Institute, of which several are already members, is the organization with which they should affiliate. As it is the purpose of the Canadian Mining Institute to further the interests of mining and metallurgy in Canada, the formation of an Iron and Steel Section is a natural development. It is understood that the Section will have a very capable executive including: Robert Hobson, Hamilton, Ont.; Col. Thos. Cantley, Mark Workman, W. C. Franz, Dr. Alfred Stansfield, W. J. Janssen, H. M. Jacquays, J. A. Irwin, C. F. Bristol, Esmond Peck, G. H. Duggan and P. L. Miller, Montreal; J. J. Hartley, Kingston; J. H. MacDougall, Sydney, N.S.; F. Crookard, New Glasgow, N.S.; Geo. W. Watts and Wm. Inglis, Toronto; J. G. Morrow, F. A. Sherman and W. M. Curry, Hamilton, Ont.; Col. David Carnegie, Ottawa; Capt. David Kyle, Sault Ste. Marie; M. Deakins, Winnipeg; Fleet Robertson, Vancouver; Geo. McKenzie. This committee will start in on the work of organization at once.

President Cole's Address.

President A. A. Cole, in his address, emphasized the fact that Canada, because of her vast resources of raw materials, would be one of nature's most favored nations, and all must prepare to take advantage of this, and do what they could to encourage greater independence and national self-reliance in its national development. Their principal work must be carried on through Governmental departments, and the Institute had urged the consolidation and strengthening of the Department of Mines, an essential part of which was improving the financial status of the technical members of the staff. The work of the department should be extended so that not only would it deal with the mining and manufacture of minerals and mineral products, but could closely study markets in close co-operation with the Department of Trade and Commerce. Closer co-operation between the Department of Mines and the provincial bureaux should be encouraged, also co-operation among producers with the sanction and support of the Government should be a watchword within the industry.

Organized action by the technical and industrial associations of the Dominion was advocated at the opening sessions. This came up in the course of a general discussion, and was approved in the following resolution, proposed by Dr. W. L. Goodwin, Kingston, seconded by Mr. R. H. Stewart and unanimously

adopted: "That, in the opinion of the Canadian Mining Institute, the time has come for the organization of the technical and industrial societies of the Dominion in such way as to enable them to take joint action in the interests of the Canadian industries, and that this subject be remitted by this meeting to the council of the institute for such consideration and action as will promote such organization."

The status of the metallurgical end of the society was also urged by Dr. Alfred Stansfield, of McGill University, with a proposal to change the name of the institute, so as to include the metallurgists, who form an important branch of the institute. In view of the amount of work that lay ahead of the meeting, Dr. Stansfield withdrew his resolution for a year, with the hope that it would not be lost sight of.

Work of J. E. Hardman and J. S. Brown Recognized.

A luncheon was held by the convention at the Windsor at one o'clock, at which the president, Mr. A. A. Cole, took the chair. He was greeted with considerable applause when he announced that a resolution had been unanimously passed by the council to commemorate the 20th annual meeting of the institute by conferring life memberships on their first member, Mr. John E. Hardman, of Montreal, and Mr. J. Stevenson Brown, of Montreal, who was for many years their treasurer.

The report of the council showed that there had been an increase in membership during the year. There were 125 members on active service, and eleven members had paid the supreme sacrifice at the Front. The total membership was 1,118, as against 1,066 in 1916. There had been 86 losses by death, resignation and removal. The treasurer's report showed a total of \$20,385, with a balance of \$1,990.

Considerable discussion took place during the afternoon session with regard to Government commissions, the general opinion being voiced by Dr. Miller, who considered that there had been too much commission business, and that work should be left more to individual enterprise.

This idea was supported by Dr. J. B. Porter, of McGill, who thought there had been too many commissions appointed. At the same time, he expressed the idea that there had been preposterous extravagance in mining and the utilization of fuel. To correct this, he thought that something might be done by appointing a central advisory body to give assistance to the legislative bodies already in existence. The need for this, he said, was shown by the wasteful methods of many small coal operators, who were simply "picking the eyes" of the mines by surface methods, and injuring their ultimate development.

Reconstruction Problems.

An interesting paper was read by Col. David Carnegie, of the Munitions Board, Ottawa, on "Some Problems in the Reconstruction of Industry."

In his address, Col. Carnegie dealt with two main problems—how to secure remunerative trade without unfair competition, and how to maintain efficient production with competitive co-operation. These two problems, he said, chiefly concerned the consumers, the sellers, the manufacturers and the workers.

With regard to the first problem, Col. Carnegie said that the great difficulty to be encountered was the indifference of people to rapid and revolutionary changes in industry, while the system of unfair competition in business really formed a public danger. This unfair competition, he said, was due to self-love and natural liberty. While not extolling German methods generally, he pointed out the excellent results that had been secured in Germany by the system of control.

For the solution of these problems, Col. Carnegie proposed a system which would utilize the best brains in each industry for controlling that industry. To this end he suggested the organization of two distinct bodies from each industry, one to secure trade and the other to encourage the production of materials. These national organizations, he suggested, should be called national and district trade boards, and district production boards, working under Government sanction.

Dr. A. W. G. Wilson read a paper on the stimulation of the mining industry after the war, pointing out that no other industry was independent of the mineral industry. Canada was economically dependent on other countries for many commodities, while many Canadian industries were wholly or in part controlled by foreign capital. Dr. Wilson said it was advisable

A motion was made by the President, seconded by Dr. Davidson, endorsing the need of educational reform as a basis for the removing of misunderstandings of the true relation of industry to the welfare of society which were the cause of the antagonistic relations between capital and labor, and the secretary was instructed to send copies of the paper to other technical and industrial societies asking them to consider the reforms advocated, so that joint action could be taken in bringing the matter to the attention of the educational authorities of the Dominion.

Many members spoke in favor of the papers, including Dr. F. H. Sexton, T. W. Gibson, deputy minister of mines for Ontario, C. J. Mackay, Toronto, Dr. Goodwin, Kingston, Prof. A. Stansfield, and others. Opposition to the scheme of Col. Carnegie was argued by G. G. S. Lindsay, of Toronto, who questioned the advisability of eliminating competition in the same manner as the Shell committee had done.

Vocational Re-education.

At the evening session Dr. F. H. Sexton gave an address on the vocational re-education of disabled soldiers from the mining industry. He pointed out that the majority of men considered unfit for further military service were not able to resume their mining



Some of the members of the Canadian Mining Institute at the Montreal Meeting, March 6th.

to consider whether some measure of the control should not be exercised by the Federal Government in connection with the establishment and location of basic industries, and whether it was not desirable to amend existing laws so that in the future the control of important mineral resources shall be vested only in the hands of residents of Canada or subjects of the British Empire. This action had been taken with respect to natural gas and petroleum resources, and it might be desirable to extend it to other similar resources that were essential for military purposes or to enable us to secure and maintain commercial independence.

The paper by C. V. Corless dealt with the Whitley scheme in force in England and pointed out that Canada would have to face the same problems as had been tackled in England, and the sooner capitalists realized this and discussed the inevitable question of the just distribution of the joint product of wealth the better. He emphasized the need of providing a sound social training in all technical institutions and of training oncoming citizens to exercise intelligently their increasing powers with their implied responsibilities, for labor had too long been left to the misguidance of half-baked Utopian social theories picked up from irresponsible but interested agitators and a cheap sensational press.

work, which required hard physical labor, but with the hearty co-operation of practically all mining companies the miners disabled by war were being trained for other occupations, and in many cases were able to earn more wages than in pre-war times.

He declared that the problem of re-establishing the returned disabled soldier was practically the first problem of reconstruction, and there was no better opportunity which had ever been offered to industry to perform a service which at once accorded in such a great degree to the best principles of national economy and the highest principles of applied Christianity.

In the discussion which followed Dr. Goodwin spoke of the classes being conducted at Kingston, and mentioned that the agricultural classes were the most popular with the soldiers.

Jas. McEvoy expressed the opinion that every returned soldier, whether disabled or not, should have an opportunity of re-education so that he could realize the higher ambitions that he had felt after taking part in the war.

A very well illustrated lecture on the Rio Tinto pyrites mines was presented by W. A. Carlyle. The enormous deposits have been worked for many centuries and the magnitude of the work was an eye opener.

Edgar Stansfield gave a brief talk on the work done at the laboratories at the capital, especially in regard to the testing of air in the mines and the carbonization of lignites. He said that the subject of the use of peat as fuel was receiving the special attention of the Department of Mines.

Fuel Problems.

Fuel economies was the subject spoken of by D. B. Dowling, who pointed out that should peace be proclaimed without the evacuation of France or Belgium, millions of tons and her iron reserves as metal by 1,025 millions of tons, and the manufactures of France would Germany would increase her coal reserves by 20,000 have to be confined to textiles and the non-metallics, and Germany would have the preponderance in coal and iron over all Western Europe, and would finally be able to lead the markets of the world. The speaker, however, pointed out there were other fuels which could be used in order to conserve the non-replaceable fuel. North America had the largest coalfields of any continent, but was also the most prodigal, and if the rate of consumption increased as in the past fifty years, the supply would be exhausted about the year 2100.

Unused Resources.

He suggested the burning of compressed straw, dead trees, and broken limbs from the forest. The water power resources of Canada totalled 18,800,000 horse power, of which at present only 1,813,200 was developed. Further research should be made to make of peat bog a solid fuel acceptable to town users.

The making of "slack coal," which was now wasted in the mines, a marketable product, was also a matter to which attention should be given. He referred to the wasteful methods in making coke, and suggested that if a large coking plant were established in Montreal, the gas produced could largely replace the use of coal and the coke could be shipped to Ontario. The recovery of the tar and other by-products would form a very important industry and supply much of the material now imported.

The Anthracite Situation.

That the coal shortage of the past winter was not the fault of the engineers and operators, or their employes, was asserted by Eli T. Conner, who spoke on the anthracite situation in the United States. The output from the anthracite region of Pennsylvania during 1917 was ten million tons more than in the preceding year, notwithstanding the shortage of sixteen to eighteen per cent. in labor. The men realized that coal was absolutely necessary to keep industries going and to prosecute the war, and, notwithstanding the fact that the working force was made up of eighteen or twenty nationalities, they were loyally responding to the calls made.

The output of bituminous coal last year was about 544,000,000 tons, and of anthracite coal about 77,000,000 tons, but there should have been about 60,000,000 tons more bituminous coal to meet the needs, and as a result anthracite had been used to make up the deficiency, even to the extent of using domestic coal for steam purposes for industries.

The principal reason for the shortage was the overloading of transportation facilities by all kinds of freight. The maximum amount of anthracite was now being produced, and it could not be increased unless the mines worked double shift which was impossible through the labor shortage.

Waste of Coal in Mining.

Speaking on the waste of coal in Canada, W. J. Dick said a large proportion of the coal mined in Canada was lost and wasted through caving of measures owing to the practice of mining lower seams of better quality first, with the result that by the caving in, the recovery of coal from the upper seams was generally impossible. In other countries leases were granted only on satisfaction being given the authorities that a proper scheme of operations was to be carried on. In Canada there was indiscriminate leasing of coal lands without restrictions, and if the mines were worked to their capacity the output would be 16,000,000 tons per annum. He deprecated the opening up of farmer or "snowbird" mines, about 400 of which had been abandoned in Alberta alone, as they had only destroyed the entrance to a coal field for large operations and were a menace to safety in the workings. He suggested that slack coal should be made into briquettes if a cheap binder could be found.

Mr. White Defends Commission of Conservation.

James White, assistant to the Chairman of the Dominion Conservation Commission, accused the Canadian Mining Institute of sending to the Prime Minister a memorandum full of inaccuracies. He declared that unless there was an end to the "most scandalous and disgraceful attacks made on the Commission," he would have to place the matter before the Hon. Clifford Sifton, the Chairman, and raise a question of whether the Institute should continue to receive the grant from the Dominion Government. Mr. White denied emphatically that the work of the Department of Mines had been encroached on, and that it could never get the necessary funds to carry out the work which the Commission had been encouraged to undertake. He declared that from 1910 till 1916 \$770,000 had been turned back to the Treasury by the Mines Department as unspent, "yet the precious bulletin declared it could not obtain funds." The memorandum inferentially stated that power had been given the Commission by order in Council to appoint permanent officials or employees in the Civil Service; the veriest tyro knew that the Government could not abrogate its power in such a manner. He declared that the field work of the Commission in regard to mines and minerals had not aggregated one thousand dollars a year, and yet they were told they spent so much that the Mines Department had not the necessary funds.

As an indication of the good work done by the Commission, Mr. White said, they defeated the application for damming the St. Lawrence at the Long Sault by an alien corporation, and also an application under the guise of a canal charter, which, if granted, would have alienated to a corporation all the water-power of the Pigeon, Rainy, Winnipeg and Saskatchewan Rivers, between Lake Superior and the Rocky Mountains. A flood of other water-power legislation was withdrawn after that.

Mr. White said he did not think there was any man with the brain of a hen who could have written some of the statements contained in the memorandum. He asked the Institute to pass a resolution of regret.

The Chairman stated that the incoming Council will deal with the matter, and the meeting accepted this ruling.

Election Results.

The result of the ballot for the President and two Vice-Presidents was announced as follows: President,

D. B. Dowling of the Geological Survey, Ottawa; Vice-Presidents, H. E. T. Haultain of Toronto and J. A. Dresser of Montreal. As the election of Mr. Dowling leaves a vacancy in the Vice-Presidents, O. E. S. White-side was unanimously elected to the position.

Councillors elected by acclamation were: Alfred Stansfield, Montreal; N. R. Fisher, Haileybury; R. E. Hore, Toronto; E. P. Mathewson, Toronto; S. B. Wright, Deloro; Jules Charbonnier, Blairmore; W. P. Williams, Bellevue; R. H. Stewart, Vancouver; Geo. Wilkinson, Victoria; W. R. Wilson, Fernie.

THE MINISTER OF MINES ADDRESSES C.M.I.

The Secretary of State and Minister of Mines, the Hon. Martin Burrell, told members of the Canadian Mining Institute at their annual banquet, that it was not his intention to attempt to introduce any new Mining Act during the coming session. He believed that the whole attention of the Union Government should be devoted to doing everything possible to help win the war, and to avoid any legislation which might be of a controversial character. The expression of this sentiment was warmly applauded, despite the fact that there had been drafted what many considered an ideal mining act.

Mr. Burrell dealt at length with the relation of the Government of the country to the people, and said that the attitude of many had changed regarding the part a Government should play in connection with industries. It was possible that before the war was over the Government of the day would take a large step in advance and nationalize certain forms of industry rather than leave them in private hands. He would, however, be reluctant to think that any form of Government or any development of Canadian national life should proceed to nationalize in such a way that it would stop that wholesome strong stimulus of private enterprise and energy that had done so much to build up the country.

Some people had suggested that Government should be by experts, but he rather subscribed to George Russell's pregnant saying, that experts should be on tap and not on top. It would be a foolish minister who did not do everything in his power to encourage specialism and be ready to be guided by expert advice when it was clear that expert advice was needed.

The Memorandum.

Referring to the memorandum submitted by the Institute to the Premier, and about which there had been some strong things said at the convention of the Institute that morning by a member of the Commission of Conservation, the Minister of Mines said it contained some pretty vigorous and sweeping criticism; but while not discussing them in detail, he was willing to subscribe to the spirit which had prompted them. He agreed that the mining industry would not only play a large part in the war, but would be of great importance in the vast reconstructive period which must follow. No man could avoid the conviction that some of the enormous problems that would face this country in the period subsequent to the war would be little less difficult than the problems of war itself. He did not see how the taxation of the country could be much less than it was to-day, and there would be the greatest necessity for stimulation and development in every conceivable way of every pound of national resources, including the brain and brawn of the citizens of the country.

Canadians had so to develop their resources that there would not be a transient development in war time but a strengthening and perpetual development in times of peace. With reference to the charge that there was

overlapping in the two branches of mines and geological survey, and that there had been such frequent changes of ministers that none stayed long enough to follow out any policy of continuity, he said that there must in every large governmental department be a certain amount of duplication but that it should be the duty of the ministers to eliminate this overlapping. The work should be correlated as far as possible and the money devoted to it directed to the proper channels, where it would be utilized in the public interest. As long as he was Minister of Mines he would give sympathetic and constant attention to the department. People must never lose sight of the paramount duty of carrying on the exploratory work on which all mining was based.

There were big problems facing the country, immense sums of money had been spent on the Hudson's Bay Railway, the wisdom of which had been questioned, but although it was to some extent a political railroad, he believed it would be of immense value from the mining point of view, as it rendered accessible to those doing exploring work a vast hinterland which might prove to be one of the greatest national assets of the future.

He hoped also to extend the valuable system of laboratories that existed at Ottawa to British Columbia, believing that they would not only help to solve immediate problems, but would give an immense stimulus to the country. Further east there were other problems, such as the lignite beds of Saskatchewan and Manitoba, and whatever the opinions held by experts of opposing schools, he maintained that if it was possible to provide for a better utilization of large bodies of material which constituted big national resources and which, in the conversion of their by-products could be of immense national benefit, then it was the duty of the Government to make an intelligent investigation and seek a solution of the problems.

Utilization of Peat.

Touching on the utilization of peat as fuel, Mr. Burrell stated that he had been studying the question for the past few weeks and was firmly convinced that something could be done to put the peat industry on an economical basis, and make accessible 120 000 000 tons of material which would be a valuable subsidiary fuel in this country. As a result of investigations, the authorities had come to fairly definite decisions in the matter and he hoped something would be done during the present session to carry on investigational and experimental work that would perhaps remove public scepticism.

Other Speakers at Banquet.

Bradley Stoughton, secretary of the American Institute of Mining Engineers, spoke of the part being played by the engineers of the United States in assisting the Government in its war work through different departments, and paid warm tribute to the heroism of the Canadian troops.

H. H. Vaughan, president of the Canadian Society of Civil Engineers, congratulated the institute on forming an iron and steel section and said that there was no need for conflict between the engineers and the mining institute as each should play its part and co-operate in the development of industry.

The president of the Mining Society of Nova Scotia D. A. Macdougall, also spoke, remarking that he believed that at the forthcoming meeting of that society a proposal would be submitted for affiliation with the Canadian Mining Institute, thus placing the latter body in a position to speak authoritatively for the whole mining industry of Canada.

At the concluding session of the Institute in the afternoon, a resolution was passed in favor of the daylight saving plan. B. Neilly, of Cobalt, was elected vice-president in place of O. E. Whiteside, who had been elected in the morning, but who had tendered his resignation from the office, feeling that the West was already sufficiently represented in the council of the Institute. A number of the members paid a visit to the Armstrong Whitworth plant on the South Shore during the afternoon.

A Collection of Tin Specimens

The Ontario Bureau of Mines has recently received from Mr. J. D. Millen, general manager of the Mount Bischoff Tin Mining Company, Tasmania, Australia, a very interesting collection of tin ores. There are in all about thirty-five specimens of ore and rock, and five samples of concentrates from the mill. Included in the collection are several very fine nuggets of water-worn cassiterite (SnO_2). The primary ore, as distinguished from the surface alluvial deposits, is innocent-looking enough. It would undoubtedly be passed over by most Canadian miners and prospectors. There is no geological reason why commercial deposits of tin may not be found in Canada, and for that reason the Bureau of Mines will be very glad to show these ores to anyone interested. As a matter of fact, very small quantities of cassiterite are already known to occur in the Yukon, British Columbia, Ontario, Quebec, New Brunswick and Nova Scotia.

It may be recalled that the tin occurrence at Mount Bischoff is the most important in Australia. The rocks on Mount Bischoff have been described as consisting of Paleozoic slates and quartzites with some sandstone and dolomite. These sediments are intersected by quartz-porphyry dikes. The dikes on the upper part of the hill are greatly altered, the original constituents, with the exception of zircon, having been decomposed. In the altered part of the dikes, a great variety of minerals have been introduced, including topaz, tourmaline, quartz, siderite, cassiterite, arsenopyrite, pyrite, pyrrhotite and fluorite. Most of the ore occurs in the quartz-porphyry dikes, and only to a minor extent in the Paleozoic slates.

In the early days, the mining was confined to the detrital or gravel deposits, which lie on the surface, and which are regarded as alluvial; these were very rich.

Mining commenced in the early seventies, the principal company, the Mount Bischoff Tin Mining Company, having distributed in the first thirty years of its activities ten million dollars in dividends.

It is to be hoped that, in the near future, Mr. Millen, who has made a very careful and detailed study of the Mount Bischoff deposits, will present a paper before some of our technical societies on the results of his investigations.

MR. GODSON'S WORK APPRECIATED.

The Daily Nugget of Cobalt speaks very warmly of the work of Mr. T. E. Godson, Mining Commissioner of Ontario. Referring to him in a recent issue, it says: "To Mr. Godson the prospectors and mining men of Northern Ontario indeed owe a debt of gratitude. His latest request that the fighting men of the country be extended every consideration and protection possible is but in accordance with his usual just policy."

INCIDENTS OF C.M.I. ANNUAL.

The Memorandum.

The now famous Memorandum, prepared by a committee of Council of the Institute and presented to the Prime Minister two or three weeks ago, received its due share of attention at the meeting. It was discussed at White heat in one of the sessions, and formed the text for a considerable part of the Minister of Mines' brilliant speech at the annual dinner.

The Major and the Maid, or Camouflage at the Smoker.

(J. W. E. an attractive "female" sauntering in his wife's clothes in the hallway near the entrance to the Smoker, catches the eye of the Major and instinctively draws him towards "herself.")

J. W. E.—"Were you at the war, sir?"

The Major (in most respectful and earnest tones) "Yes, ma'am, eighteen months."

(Then disclosure of indentivity by J. W. E.)

Coal and Briquettes.

Overheard in the rotunda after the animated debate on coal briquettes; the first conceived but yet unborn offspring of the H.A.C.S.I.R. "I say, old man, if you have any financial interest in coal, developed or undeveloped, between the boundless plains and the wide Pacific, you are a fakir and a grafter, and to use a Sunday School expression, there is no health in you. Go off and sit down, and let not your voice be heard in connection with fuel. Eh what! Weren't you told so?"

Another Case of Mistaken Identity.

The Chairman of Smoker (in rapid fire, stirring tones during a lull in the proceedings). "Gentlemen, I understand we have the honor to have with us tonight Mr. Donnelly, inventor of the unsinkable ship. We shall be pleased if he will come to the platform and address us on a subject that is of great interest to the Allies and to the world in general."

John Donnelly, our most successful raiser of sunken ships, sitting in the southeast quarter of the room, surrounded by a group of Queen's men as usual, immediately "takes notice" and wonders what kind of stunt is to be pulled off on him. Those surrounding him also think the joke is now to be on him and raise a loud laugh. In the meantime, a stranger to the audience rises in the northwest quarter and approaches the chairman. He ascends the platform, and proves to be Donnelly, the inventor, of Washington, D.C., and other parts of the coast. In beginning his address he is somewhat flurried as he thinks the audience is laughing at his ship. Sinkable and unsinkable! But then Ignatius Donnelly, now gathered to his fathers, achieved fame by asserting that Bacon was Shakespeare, and vice versa.

The Institute's Twentieth Birthday.

The youth has reached manhood's estate. He is in khaki and can vote. His teething-measles-mumps stage bothered him but little. He was a robust infant. His parentage was good. The years have dealt lightly with many of those who were present at his birth. His godfather, the first president of the Institute, is still "one of the boys." G. R. and F., other past-presidents, prove that a youth spent according to Spartan laws defies time and that twenty years in their case mean but little. J. S. B. is just as lively on a St. Andrews night, when the haggis is borne aloft, or when he is enticing the wily trout in Laurentide streams, as he was in '98. But many of the best are gone. Bell and Leckie and Hay, and the younger Fraleek and LeRoy. What good fellows they were!

THE COMMISSION OF CONSERVATION.

At the Friday morning session of the meeting of the Canadian Mining Institute, Mr. Jas. White, assistant to the chairman of the Commission of Conservation, proposed a resolution expressing the regret of the Institute that the memorandum contained serious errors of statement respecting the Commission of Conservation, which were set out in detail.

The motion was seconded by W. J. Dick, who stated that, as a member of the council, he had not seen the memorandum, which was drawn up by a committee. Had he seen it he could have pointed out the errors.

The Chairman ruled that the matter was one which must be dealt with by the council, and no doubt the incoming board would make any corrections that should be made.

Mr. White maintained it was a question of right or wrong and should be decided by the meeting. A serious wrong had been done in a document distributed from coast to coast and his resolution called for a contradiction of the misstatements. He did not care a rap for technicalities or points of order, he stood for right and justice and he wanted to know if he was going to get it.

The Chairman: You will get right and justice, but I don't think this meeting is the place for that motion. If the meeting wishes to put aside my ruling they can do so.

Dr. Goodwin said the statements needed to be investigated, and if the memorandum was incorrect and unjust, the wrong done should be remedied. But the council should investigate it, and the meeting should not be asked to pass a resolution without investigation. He moved the matter be referred to the council for consideration and action.

Mr. White: Every statement I have made is contained in public documents, and I can demonstrate them right here. I never thought there was any man with the brain capacity of a hen, who would write some of the statements contained in that memorandum.

Dr. Goodwin: Even a murderer caught red-handed is not hung without a trial.

Mr. White: I did not know this was a criminal trial—it is a question of whether the meeting is going to back up these misstatements or not.

The Chairman: I may be wrong, but I have given my ruling, and it is for the meeting to say whether that is upheld. I am sure the council will take action and see that any inaccuracies or misstatements or any false statements will be corrected and proper means taken to see they are put before the proper authorities so that there will be no misunderstanding as to their meaning.

The motion to refer to the incoming council was seconded by A. G. Burrows, Toronto, and was carried.

BIG RAIL ORDER.

Ottawa, March 11.—An order for 100,000 tons of steel rails, or enough to lay tracks on some 800 miles of railroad, has been placed by Hon. J. D. Reid, Minister of Railways, on behalf of the Government, with the Dominion Iron and Steel Company. The rails are to be manufactured at the company's plant at Sydney, Cape Breton, and all are to be delivered by the end of July next. Rolling will begin on April 1st and it is hoped that during April 10,000 tons can be ready for use in making replacements on Canadian railways. In May, June and July it is expected that the rail mill will be producing up to its full capacity, and

that deliveries will reach 30,000 tons a month. The rails will be heavy ones, probably 85 pounds to the yard, and will be suitable for renewals on railway main lines.

Preliminary Report on Production in 1917

(Extracts from a preliminary report published by the Department of Mines, Ottawa.)

By John McLeish.

(Continued from March 1 issue.)

Coke.

The total output of oven coke during 1917 was 1,231,865 short tons made from 1,978,893 tons of coal, of which 1,379,038 tons were of domestic origin and 599,855 tons imported. The total coke used, or sold by producers during the year was 1,245,862 tons valued at \$6,713,073, or an average of \$5.39 per ton. In 1916 the total output was 1,448,782 tons and the quantity sold by the producers was 1,469,741 tons, valued at \$6,049,412, or an average of \$4.19 per ton.

By provinces the output was: Nova Scotia 645,069 tons, a decrease of 8,767 tons; Ontario 375,014 tons (all from imported coal), a decrease of 77,488 tons; Alberta 31,196 tons, a decrease of 11,352 tons; and British Columbia 180,586 tons, a decrease of 119,310 tons.

The ovens operated during the year were those at Sydney and Sydney Mines, N.S., Sault Ste. Marie, Ont., Coleman, Alta., and Fernie, Michel and Union Bay, B.C.

At the close of the present year 1,657 ovens were in operation and 875 were idle.

The exports of coke in 1917 were 23,595 tons valued at \$137,318, as against 48,539 tons valued at \$221,334 in 1916. The imports of coke in 1917 were 970,106 tons valued at \$6,517,260 as against 757,116 tons valued at \$3,229,078 in 1916.

Recovery of By-Products.

Of the total output of coke 914,466 tons, or 74 per cent. was made in by-product recovery ovens and the recovery of by-products included: Ammonium sulphate 9,941 tons, and tar 8,277,078 gallons, as against 11,040 tons of sulphate of ammonia and 9,012,202 gallons of tar in 1916. There was also an important recovery of benzol, toluol, naphtha and naphthalene.

Fluorspar.

High prices have stimulated the mining of fluorspar at Madoc, Ontario, and production has increased from 1,284 tons valued at \$10,238, or an average of \$7.97, to 4,249 tons valued at \$68,756, or an average of \$16.08 in 1917.

There is an annual consumption of fluorspar in Canadian steel furnaces of from 10,000 to 15,000 tons.

Graphite.

The production of graphite in 1917, which was 3,714 tons valued at \$402,892, included 541 tons valued at \$106,305, or \$196.50 per ton, from Quebec and Baffin Island and 3,173 tons valued at \$296,587, or an average of \$93.47 per ton from mills in Ontario.

Graphite operators reported that of the total shipment 3,510 tons valued at \$372,167 were sold for export. The Customs records show exports of plumbago, crude ore, and concentrate, 112 tons, valued at \$7,455, and manufactures of plumbago valued at \$384,505.

It is of interest to note that a small shipment of high grade graphite was made during the year from deposits which were worked by the Hudson's Bay Company in the vicinity of Lake Harbour on Baffin Island. This graphite was sold to the Dominion Crucible Company at St. Johns, Que., who confirm the opinion of the Hud-

son's Bay Company that this graphite is of very high quality and comparable with the best Ceylon product.

Gypsum.

The total quantity of gypsum rock quarried in 1917 was 365,959 tons, of which 97,667 tons were calcined. The shipments of all grades totalled 339,418 tons, valued at \$887,170 and included lump, 226,846 tons, valued at \$251,960; crushed, 32,305 tons, valued at 51,869; fine ground, 4,843 tons, valued at \$19,222, and calcined, 75,424 tons valued at \$564,119. By provinces the shipments were: Nova Scotia, 218,588 tons valued at \$306,447; New Brunswick, 38,556 tons, valued at \$191,631; Ontario, 48,947 tons, valued at \$130,138; Manitoba, 33,347 tons, valued at \$258,934.

In 1916 the quantity quarried was 424,431 tons, of which 94,414 were calcined. The shipments included: Lump, 249,893 tons; crushed, 15,680 tons; fine ground, 6,096 tons, and calcined 71,246 or a total of 342,915 tons valued at \$738,598.

Exports of crude gypsum were 224,423 tons, valued at \$245,182, and of gypsum or plaster ground valued at \$146,384. The corresponding exports in 1916 were crude gypsum, 221,234 tons, valued at \$252,476, and gypsum or plaster ground valued at \$154,630.

The imports of gypsum of all grades during 1917 were valued at \$35,460 and included: Crude gypsum, 64 tons, valued at \$999; ground gypsum, 282 tons, valued at \$5,355, and plaster of Paris, 3,101 tons, valued at \$29,106. The total value of imports in 1916 was \$43,291.

Magnesite.

The production of magnesite was confined to the deposits in Argenteuil county, Quebec. The shipments in 1917 were 58,090 tons, valued at \$728,275 and include crude ore, calcined magnesite (burnt in the lime kilns) and dead burnt clinker (sintered in rotary kilns after mixture with about 5 per cent of magnesite). The crude ore was sold at about \$10 per ton, the calcined at \$28.50, and the clinkered, or dead burned material at from \$40 to \$46 per ton. The shipments in 1916 were 55,413 tons valued at \$563,829, or an average of \$10.17 per ton, and 14,779 tons valued at \$126,584, or an average of \$8.56 per ton in 1915.

Petroleum.

The production of crude petroleum in 1917, while about 7,000 barrels greater than in 1916, was less than the production of any other previous year for which records are available. A bounty of $1\frac{1}{2}$ cents per gallon is paid on the marketed productions of crude oil from Canadian oil fields, the administration of the "Petroleum Bounty Act" being under the Department of Trade and Commerce. According to the bounty record the production in 1917 in Ontario and New Brunswick was 205,332 barrels (8,186,614 imperial gallons). The average monthly price for crude oil during the year was \$2.33 $\frac{1}{4}$ at which rate the total production would be worth \$478,937. There was also a small production of crude oil in Alberta of which record has not yet been received. The specific gravity of this oil is below the standard specified in the "Petroleum Bounty Act" and no bounty is therefore paid thereon. According to press report based on inland revenue inspection records there was a recovery during the year from Alberta crude oils of 270,000 gallons of gasoline and refined illuminating oils.

The total production of crude oil in 1916 (exclusive of Alberta) was 198,123 barrels valued at \$392,284 compared with which the 1917 production shows an increase of about 3.6 per cent. in quantity but of over 22 per cent. in total value.

The price of crude oil at Petrolia was quoted at \$2.08 per barrel at the beginning of the year and was increased by 10 cents on January 8, 5 cents on January 30, 5 cents on April 16, and by 20 cents on August 20, running at \$2.148 throughout the balance of the year. The average monthly price for the year was 2.33 $\frac{1}{4}$ as against an average price of \$1.98 in 1916 and \$1.395 in 1915.

The Ontario production in 1917 was, according to the records of the Department of Trade and Commerce at Ottawa, 202,991 barrels. The production in barrels of the various fields as furnished by the Supervisor of Petroleum Bounties at Petrolia, was as follows, in barrels: Petrolia and Enniskillen, 74,267; Oil Springs, 46,902; Sarnia Tp., 4,493; Moore Tp., 6,282; Plympton Tp., 579; or a total for Lambton of 132,523 barrels; Bothwell, 29,682; Tilbury, 10,041; Dutton, 2,941; Onondaga, 382; Moza Tp., 20,998 and Thamesville, 6,420. The Bounty Supervisor states that "A new, extensive oil field at North Glencoe in the Tp. of Moza, in the County of Middlesex, has created a great deal of interest among oil producers and has already produced about 21,000 barrels."

This new production has offset a continued falling off in the production from the older fields.

The production by districts in 1916 was: Lambton, 142,208 barrels; Bothwell, 33,856 barrels; Dutton, 2,851 barrels; Tilbury, 16,296 barrels; Onondaga and Belle River, 1,663 barrels.

The production in New Brunswick, according to bounty records was 2,341 barrels in 1917 as against 1,345 barrels in 1916 and 1,020 barrels in 1915.

Exports of petroleum entered as crude mineral oil in 1917 were 2,130 gallons, valued at \$183, and of refined oil 28,212 gallons valued at \$6,558. There was also an export of naphtha and gasoline of 24,304 gallons valued at \$7,419.

The total value of the imports of petroleum and petroleum products in 1917 was \$21,455,326 as against a value of \$14,705,323 in 1916.

The total imports of petroleum oils, crude and refined, in 1917, were 378,224,746 gallons, valued at \$21,239,347. These oil imports included: Crude oil for refining, 183,105,102 gallons valued at \$8,411,730; petroleum and gas oils 142,455,582 gallons valued at \$4,521,854; and illuminating oils, 13,457,096 gallons, valued at \$1,093,560; lubricating oils, 5,315,811 gallons, valued at \$1,209,930; gasoline, 15,369,172 gallons valued at \$3,293,760, and other oils, products of petroleum, 18,521,983 gallons, valued at \$2,708,513. The imports of petroleum products included 1,620,634 pounds of paraffin wax valued at \$140,722, and paraffin wax candles 513,339 pounds, valued at \$75,257, or a total value of \$215,979.

The total imports of petroleum oils, crude and refined, in 1916 were 292,426,121 gallons, valued at \$14,604,476. The imports of paraffin wax and wax candles were 1,281,376 pounds valued at \$100,847.

Pyrites.

The total shipments of pyrites as sulphur ore in 1914 were 403,243 short tons valued at \$1,586,091 and containing a total sulphur content of 150,896 tons, or an average of 37.4 per cent. The average sulphur content varied among the shipping mines from 34.5 per cent. to 46 per cent. By provinces the shipments were: Quebec, 122,822 tons, valued at \$501,111; Ontario, 274,712 tons, valued at \$1,056,435; and British Columbia, 5,709 tons valued at \$28,545. Of the total shipments, about 341,676 tons, or 85 per cent, were exported to

the United States, according to producers' reports, the sulphur content of which was 126,106 tons.

The 1916 shipments of pyrites were 309,251 short tons, containing 116,980 tons of sulphur, or an average of 37.8 per cent., the increased production in 1917 being 93,992 tons, or 30 per cent. By provinces the shipments were: Quebec, 130,639 tons; Ontario, 177,552 tons, and British Columbia, 1,060 tons.

The Customs record shows exports of pyrites during 1917 as 279,646 tons, valued at \$974,200. Apparently the exports of copper pyrites from Quebec are not included in this record. Exports of sulphuric acid during 1917 were 18,955,100 pounds, valued at \$197,888, as against 3,151,700 pounds valued at \$74,527 in 1916. Imports of brimstone, or crude sulphur, in 1917, were 82,445 tons, valued at \$1,515,309 and in 1916, 73,467 tons, valued at \$1,186,618. Imports of sulphuric acid in 1917 were 216 tons valued at \$15,680, as against imports in 1916 of 2,403 tons, valued at \$115,173.

Salt.

The Canadian production of salt is still obtained entirely from southern Ontario and the yearly output has been slowly though steadily increasing. Total sales in 1917, including the salt equivalent of brine used for chemical manufacturing were about 138,909 tons, valued at \$1,047,792 as against 132,903 tons, valued at \$717,653 in 1916. These values are, as far as possible, exclusive of packages. The value of packages used in 1917 was \$403,879 and in 1916, \$309,603. By grades the production included: Table and dairy, 34,252 tons; common fine, 65,117 tons; common coarse, 37,398 tons; and land salt, 2,142 tons. The production by grades in 1916 was: Table and dairy, 35,045 tons; common fine, 54,596 tons; common coarse, 41,259 tons, and land salt, 2,003 tons.

The exports of salt in 1917 were 8,643 tons valued at \$94,364. The imports of salt were 170,810 tons valued at \$1,088,205 and included 44,973 tons of fine salt in bulk valued at \$184,792; 12,293 tons of salt in packages valued at \$120,665; and 113,544 tons of salt imported from Great Britain for the use of fisheries, valued at \$782,748. The total imports in 1916 were 101,208 tons valued at \$694,835.

Structural Materials.

The total value of the production of structural materials including cement, clay products, lime, sand and gravel, stone quarries, etc., for the year 1917 was \$19,102,571, an increase of \$1,635,385, or 9.4 per cent. over the 1916 value. This is the first increase in production of this class of products that has been recorded since 1913. The total having been \$17,467,186 in 1916, \$17,920,759 in 1915 and \$26,009,227 in 1914.

Cement.

The total quantity of Portland cement sold, or used in 1917 was 4,768,488 barrels of 350 pounds each valued at \$7,699,521 or an average of \$1.61 per barrel, as compared with 5,369,560 barrels sold, or used in 1916 valued at \$6,547,728 or an average of \$1.22 per barrel showing a decrease in quantity of 601,072 barrels or 11.2 per cent., but an increase in total value of \$1,151,793, or 17.6 per cent.

The total quantity of cement made in 1917 was 4,987,255 barrels, as compared with 4,753,033 barrels, an increase of 234,222 barrels or 4.9 per cent. Cement mills were slightly more active in 1917. The output was sufficient to increase stocks during the year by about 220,000 barrels whereas in 1916 the output was less than sales and stocks were drawn upon to the extent of about 620,000 barrels.

The total imports of cement in 1917 were 30,031 cwt. equivalent to 8,580 barrels of 350 pounds each valued at \$19,646, or an average of \$2.29 per barrel as compared with imports of 20,596 barrels valued at \$31,621, or an average of \$1.54 per barrel in 1916.

The total consumption of cement, therefore, neglecting a small export, was 4,777,068 barrels as compared with a consumption of 5,390,156 barrels, showing a decrease of 613,088 barrels, or about 11.4 per cent.

MURCHISON MEDAL AWARDED TO J. B. TYRRELL.

At the annual meeting of the Geological Society of London, held in London, England, on the 15th of February last, the president presented the Murchison Medal to J. B. Tyrrell, Mining Engineer, of Toronto. In making the presentation, he said in part:

"The Murchison Medal has been awarded to Mr. Joseph B. Tyrrell in recognition of the value of his many services to geological science. In the breadth of their scope, in the pioneer element which has so largely entered, in the practical benefits which have often followed, those services may stand as typical of Canada's contribution to Geology.

"During more than thirty years Mr. Tyrrell has been frequently engaged in exploring wide tracts of the little known lands of Northern Canada, making numerous prolonged journeys of a kind which demands no ordinary resolution and endurance. Besides thus adding largely to geographical knowledge by his own efforts, he has done much to make known the results of earlier explorers in the North. While helping very materially to develop the mineral resources of the Dominion, he has at the same time gathered much valuable information touching the older rocks of the region; and, uniting in his own person the geologist and the prospector, he has often shown by example how science and enterprise may go hand in hand, to the great advantage of both.

"On the side of pure science, however, his most notable researches have been made in the domain of Glacial Geology, where his wide acquaintance with the country has enabled him to arrive at conclusions of a large order. Prior to 1894 it was generally held that the ice which once overspread Canada, east of the Cordillera with its mountain-glaciers, emanated from a single centre of dispersal. Mr. Tyrrell first demonstrated the existence and approximate limits of a great ice-sheet, which he named the Keewatin, centring in the country west of Hudson Bay and distinct in origin from the Labradorean ice-sheet to the east. To these two he subsequently added a third, under the name of the Patrician Glacier, which had its gathering-ground to the south of Hudson Bay. His development of this thesis, involving a discussion of the relations in time and space of the ice-sheets radiating from different centres, must rank among the most important contributions to the Glacial history of North America.

"In forwarding to Mr. Tyrrell this token of recognition from the Council of the Geological Society, I beg, Sir, that you will add to our congratulations upon what he has already accomplished our hope that many years of activity still remain to him; and this wish will, I am sure, be echoed by his numerous friends on both sides of the Atlantic."

In Mr. Tyrrell's absence, Sir George Perley, High Commissioner for Canada, received the medal for him, acknowledging the honor in the following appropriate remarks:

"Mr. President and Members of the Geological Society: I am very happy to come here to-day and receive this medal on behalf of Mr. Tyrrell and I only regret that he is not here himself for that purpose. He was in London for some time last year; but, unfortunately, had to return to Canada last month, so that he has missed the pleasure of being with you to-day. As I live in Ottawa I have known Mr. Tyrrell for a long time. He is a native-born Canadian and was for many years connected with the Canadian Geological Survey. He showed much resource and energy in his work and it is very fitting that he should be recognized by your Society in this way.

"I may say that in our Dominion we are proud of our Geological Survey and of what it has done. We have a large country with great undeveloped mineral resources which the Geological Survey has done a great deal to help discover and utilize. Fortunately Canada has been able to assist more than could have been expected in providing minerals and metals during the war. Many supplies from enemy countries have been cut off and higher prices have encouraged enterprise. In consequence we have not only provided large quantities of nickel, but we have developed our copper, lead and zinc industries to a very considerable extent. Even so, I feel sure that our mineral and metal products will be greatly increased in the future and we believe that our resources in that direction have been hardly scratched. To exemplify this I would remind you that the wonderful silver deposits at Cobalt in Ontario were only discovered by chance, although lumbering had been carried on over that district for a great many years. The Ontario Government built a line of railway from the Canadian Pacific into the North country and in so doing crossed this great silver deposit, which is still producing heavily.

"As representing Canada, I am proud to receive this Medal on account of our Dominion, as well as on account of Mr. Tyrrell personally. It seems peculiarly appropriate at this time that this honor should be given by this old and important Society to a Canadian and we appreciate the same greatly.

"I accept the Medal on behalf of Mr. Tyrrell with grateful thanks, and it will give me much pleasure to forward it to him and communicate the very kind words with which you, Mr. President, have accompanied it."

THE UNSINKABLE SHIP.

Montreal, March 8.—The idea incorporated in the attempt made to render unsinkable the steamer Lucia, an Austrian vessel, taken over by the United States, came to its inventor, W. T. Donnelly, while building the dry-dock at Prince Rupert, B.C., he told the Canadian Mining Institute last night. The waste space in the Lucia is filled with buoyancy boxes.

Mr. Donnelly said at Prince Rupert he wanted to ballast the dock, and instead of putting stone in the bottom he experimented by placing a similar weight of wood on the wings of the dock, with the result that when pressure was put on the dock and it was driven lower into the water, the wooden ballast reversed its function and became additional buoyancy to such an extent that the dock was unsinkable.

Mr. D. B. Dowling, of Ottawa, has been elected president of the Canadian Mining Institute. Mr. H. E. T. Haultain, of Toronto, and Mr. J. A. Dresser, of Montreal, are elected councillors.

A Barytes Mine in Northern Ontario

Almost unknown to the Canadian public there has been developed by Premier Langmuir Mines, in Northern Ontario, a mine for the production of barytes, a mineral used largely in the paint and chemical industries.

The company owns 250 acres on the Night Hawk, a navigable river, in the Porcupine Mining Division, in what is known as the Night Hawk Lake area. A considerable portion of the property has been cleared and comfortable camps have been constructed for the workmen on the high ground overlooking the river.

The baryte occurs in a system of veins, one of which is shown in the accompanying illustration. Considerable development has been done, including the running



of a tunnel 100 ft. in length and the sinking of a shaft which is now under way. The ore in sight is remarkably pure and white.

A feature of this deposit that should not be overlooked is the fact that silver in both the native and sulphide forms is present in such amount as seems to warrant the hope that sufficient of this metal will be obtained to at least defray all operating costs.

The company is now at work on the equipment of a mill for the treatment of the ore, the buildings for which are now all completed, and are partially shown in one of the illustrations. All are covered with asbestos fire proof material.



Transportation from the mine to the Night Hawk river is provided for by a tramway, gravity being the only motive force required to carry the product to the barges of the company, by which it will be transported to Connaught Station on the T. & N. O. Ry., which will be the company's shipping point.

An Iron Industry for British Columbia

The subject of the establishment of an iron and steel manufacturing industry in British Columbia has lately been given much attention in Victoria and several less important towns on Vancouver Island, as, too, it had previously been considered in Vancouver. The present outcome of the numerous meetings and discussions, having as their chief object measures to utilize in the province the iron-ore resources of the Coast district, is that a committee representative of several public bodies has been selected to proceed to Ottawa with the purpose of seeking substantial aid from the Dominion Government to establish iron and steel works on the coast of British Columbia.

It seems to have been taken for granted by some of those prominent in this movement to endeavor to induce the Dominion and Provincial Governments to become financially responsible for the starting of an industry that heretofore no capitalists have shown themselves ready to undertake, that little dependable information is in the possession of the Dominion Government relative to the iron-ore resources of the British Columbia coast. The fact that investigations were made during recent years by Messrs. E. Lindeman, R. G. McConnell, C. H. Clapp, O. E. LeRoy, and other officials of the Canada Department of Mines, has either been ignored or was not known to those now advocating inquiry and investigation by the Dominion Government. Further, there is a wide discrepancy between statements made at meetings held recently on the British Columbia coast as to the quantity of iron ore known to be available and that estimated by men employed by either the Dominion or the Provincial Government to investigate the situation. For instance, one man claiming to be qualified to express a dependable opinion has been asserting that some 50,000,000 tons of iron ore is available on the British Columbia coast, against which there is the carefully prepared statement of Mr. W. M. Brewer, contained in a bulletin, published by the B. C. Department of Mines, on "The Iron-ore Deposits of Vancouver and Texada Islands," which comprise the chief known accessible deposits on the coast, that the "tonnage of ore available" is estimated by him at 12,888,200 tons, of which 470,000 tons is "actual ore," 4,537,600 tons is "probable ore," and 7,880,600 tons is "possible ore." Mr. Brewer made his investigations for the B.C. Department of Mines in 1916, as he stated in his report "principally for the purpose of bringing up to date the information regarding the iron ores already in the possession of the Bureau of Mines." In preparing his report, he had before him reports previously made for the B. C. Department of Mines by Mr. Herbert Carmichael and the Provincial Mineralogist, and those of Messrs. Lindeman, McConnell and Clapp, for the Canada Department of Mines. In addition, there were "reports from examinations made by mining engineers for private clients previous to 1910, which have not been published."

In March, 1917, there was submitted at a meeting of the Western Branch of The Canadian Mining Institute, held in Vancouver, a paper on "Opportunities for the Establishment of an Iron and Steel Industry in British Columbia." In the course of the discussion that followed, Mr. John M. Turnbull, who, after years of work as a field engineer for the Consolidated Mining and Smelting Co., is now professor of mining at the University of British Columbia, said, in part: "The difficulty in regard to ores is the problem of first import-

ance. I believe there are large quantities of magnetite ore on this coast, but we have no definite knowledge as to what quantity can be obtained and its probable average grade and character."

Mr. E. T. Hodge, professor of geology at the University of British Columbia, said, in part: "We hardly have a right to discuss questions of manufacture until we have settled the far more important matters of occurrence, quantity, availability, and smelting suitability of our iron ores. But, in view of the great ease of transportation from Vancouver to many Asiatic cities, we ought, with a proper supply of cheap iron ore, to become a manufacturing and distributing centre for iron machinery or other high-grade products. It has been stated that several of our iron deposits are suitable for smelting, but as scarcely any of these have been opened, we do not know to what geological type they belong and consequently cannot tell anything about their size or uniformity. We cannot, with advantage, build smelters until we have some definite idea as to tonnage, nor can we do so until we know the type of ore we have to treat. I think you will admit that, with the limited geological examination which our iron-ore deposits have received, except in a few instances, that we have only a faint idea as to the tonnage, and no conception as to the type of ores which a smelter would have to treat. Many of these facts must be known before we can plan definitely for a smelter and before we can interest capital in the manufacture of iron from our ores."

When the present session of the Legislative Assembly of British Columbia was opened recently, the Lieutenant-Governor, in the course of his address, said: "My Government is securing the services of an expert to advise on the electro-thermic treatment of iron ores, and measures for the encouragement of iron and steel industries will be presented for your consideration." In the address in reply, there occurs the following paragraph: "We warmly approve the action of the Government in securing expert advice on the electro-thermic treatment of iron ores, and we will give our best consideration to proposed measures for the encouragement of iron and steel industries." The member who moved the adoption of the address in reply, however, made the following comment on this subject: "Assuming that the Province possesses the iron-ore deposits and that conditions are favorable for the establishment of an iron and steel manufacturing industry, I doubt whether in going to Ottawa seeking assistance, this Province is doing the right thing. Here, on Vancouver Island, all the resources in generous abundance exist. Do not the people of British Columbia possess faith in themselves to develop their own wealth, especially in this time of Empire stress? I believe they do. Not alone would such an industry aid in winning the war, but would also build up the industrial development of the Province after the war is over, and especially to the end that industrial work may be available for the men on their return from the front. Why, in the face of the noble response for funds for the Victory Loan, the people of the Province could not also provide amply for industrial development, I do not know."

The delegates appointed to proceed to Ottawa have been told by the Vancouver Island members of the House of Commons that the Federal Government will likely ask them what evidence they have of a substantial industrial purpose on the part of the people of British Columbia in regard to the proposed iron and steel development, before any suggestion may be made as to the nature of the support it might give to such a

project. The suggestion that the Dominion Government undertake the business of development is quite out of the question. A concrete proposal will be required from the delegates. It was pointed out, too, that the labor situation in British Columbia appears to be a detrimental prospect which will have a bearing on the attitude of the Government. Also, the Government may require that it be given some definite information as to where a market is to be found for the products, should an iron and steel industry be established, as asked for.

The outcome of the movement is being awaited with much interest, but, meanwhile, no information has been made public indicating that capital is, or will be, available for the proposed undertaking.

WILL INVESTIGATE PEAT POSSIBILITIES.

Ottawa, March 11.—The Dominion Government and the Government of Ontario are to co-operate it is announced here, in comprehensive experimental work during the coming season in the possibilities of peat as a fuel. The question has been under consideration by the Recommendation and Development Committee of the Cabinet. Special attention has been given to it also by Hon. Martin Burrell, Minister of Mines, who has considered it with the technical officers of his department, with R. A. Ross, consulting engineer, of Montreal, who is a member of the Research Council, and with E. V. Moore, who constructed the first mechanical peat excavator built in Canada.

Toronto, March 12.—Wide powers to go ahead with the development of the fuel resources of Ontario are to be given the Government by legislation introduced in the House yesterday by Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines. The Minister announced that it was the intention of the Government to appoint either a Fuel Controller or a commission to investigate the fuel resources of the province. To provide the money necessary for such an investigation the Government already had had \$100,000 set aside in the supplementary estimates.

The Minister explained to the House that the development of peat resources had been a matter of conference between the Dominion and Provincial authorities. Economy in operation was desired and for that reason it was necessary to avoid over-lapping between the two Governments. As soon as a working basis had been agreed upon a start would be made. The Minister said that new equipment had been devised for manufacturing peat into commercial form, and that experiments would be made with it. He emphasized the importance of finding the best labor-saving devices, since, if labor had to be relied upon to a large extent, the cost of production would be too large to ensure the future of the industry.

Mr. A. A. Hassan has for an indefinite period discontinued operations at the Great Falls gold mine in Maryland and is now at 666 Mansfield Place, Brooklyn, N.Y. He will open an office in New York City. Mr. A. A. Hassan, Jr., has joined the U.S. Aviation Corps and is now a first Lieutenant and Instructor in Aviation at Gerstner Field, Lake Charles, Louisiana. Mr. Hassan's younger son, Ennis, has also volunteered for the U.S. Flying Division.

Mr. D. C. Bard, consulting engineer to the Ladysmith Copper Corporation, has been examining mining property on Quadra Island, of the Valdes group.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

On his return to Victoria, at the end of February, Mr. R. F. Green, who represents West Kootenay in the Dominion House of Commons, stated that during an extended trip he had made recently through that district, he had found business conditions in the chief centres generally fair, with the exception of Slocan and Ainsworth, where mining operations have been affected by the action of the Consolidated Mining and Smelting Company in enforcing a new schedule of charges for the reduction of silver-lead and lead-zinc ores at its smelting works at Trail. In those two divisions, a number of the mines have been closed. At the same time, conditions are now nearly normal at Trail and Rossland, where labor difficulties and a shortage of coke had for a time necessitated a suspension of operations. In the mines in Rossland camp, about 500 men are now employed, as compared with approximately 600 before the suspension of mining, while at Trail about 1,300 men are engaged at the smelting and refining works, against 1,500 before the strike that took place last November. The difficulties between the Slocan and Ainsworth mine-operators and the Consolidated Company relative to quantities of ore the company has announced it will accept for smelting and the higher scale of charges it has demanded, have been under discussion for some time. The advisability of having a Federal investigation into the whole matter in dispute is being urged by the mine-operators. On the other hand, the smelting company is stated to be willing to submit its case for full consideration. Mr. Green expresses the hope that an amicable settlement of these difficulties will be reached.

In this connection, it may be mentioned that at the Northwest Mining Association's annual convention, held in Spokane, Washington, during the week of February 11-16, there was strong complaint made against the recent policy of the Consolidated Mining and Smelting Company, and bitter denunciation of what was asserted to be its intention to force the independent mine-operators out of the mining business in the West Kootenay district of British Columbia. To understand that the British Columbia mining men, who told of their present difficulties, occasioned largely by deferred settlements and increased charges, and of the discouraging prospects for silver-lead mining between much decreased returns from the smelting works and the considerable increase in taxation imposed by the Provincial Government, had a generally sympathetic audience, it should be remembered that by far the greater number of operating mines in the Ainsworth and Slocan mining camps have been in late years financed from Spokane, and that in a number of important instances, control of them is held in that city.

An example of the bad effect recent experience is having, may be found in the case of the Florence Silver Mining Company, with headquarters in Spokane, which company, after having for about six years steadily developed a mine in Ainsworth camp, in 1916-1917 erected and equipped a concentrator and entered on what it was planned should be a long period of production of silver-lead ore and zinc concentrate. On February 21, the Kaslo "Kootenayan" printed the following:

"We have been up against this sort of thing ever since we got in a position to operate our mill," said

President F. R. Wolfe, of the Florence Silver Mining Co., the other day, referring to the latest circular received from the Consolidated Mining and Smelting Company. "Last year, every time we thought we had things right and in shape, along would come some new circular from the Consolidated Company that would upset the whole kettle of fish. This last affair is the crowning outrage of all. Personally, I do not kick quite so much on the increase, which is bad enough, as on the mode of settlement for lead, which is worse. If I let them take our lead and stack it away awaiting the getting of a better market price, I can come pretty near to guessing that they will sell it for me at the lowest price they can get.

"If ever there was a time that the independent silver-lead producers of that region should organize, it is right now. If we do not, the only thing I can see is for us to pocket our losses and get out.

"The Consolidated Company has things fixed so that it costs about the same for ore treatment if the producer ship to American smelting works or if he ship to Trail. With the Florence mine, we can do nothing else but lose money on our ores, if we ship to Trail and pay short-haul transportation charges without customs duty, and the exorbitant demands of the Consolidated Company. If we ship to the United States and pay long-haul freight charges and customs duty, with lower smelting charges, then it figures out about the same. It is certainly very cleverly arranged.

"If the duty is taken off Canadian lead ores going into the United States, then we may be able to operate the Florence mine and mill at about an even break. It would help some, perhaps, to keep things going until we get the smelting rate question adjusted so that there would be more in the nature of a square deal for the independent producer."

A Mineowners' Association.—Incidentally, it is of interest to note that another attempt is to be made to put life into an organization, named the British Columbia Mineowners' Association, which was launched at Nelson several months ago, but in which the mine-owners and mine managers of Kootenay district have not yet taken much interest, the meeting called to complete organization having lapsed by reason of the smallness of the number attending at the time and place at which officers and committee were to have been chosen and other preliminaries carried out. The announcement calling another meeting at Nelson states that "those who have not yet joined the organization will be given an opportunity of doing so. It is imperative that every Kootenay mine should be represented at this meeting, as matters of the utmost importance to all silver-lead and zinc-ore producers will be dealt with; and more especially the present intolerable smelting situation, which has rendered mine operation almost impossible. If plans do not miscarry, a series of resolutions will be drawn up to be submitted to the forthcoming annual meeting of the Associated Boards of Trade of Eastern British Columbia, the endorsement of which body will be sought. One of these resolutions will urge the Dominion Government to suspend the free importation of lead and zinc ores into Canada until such time as the United States shall permit ores of a similar character to go into the United States free of customs duty, or, in other words, until such time as there shall be reciprocity between the United States and Canada in respect to these ores. Another resolution will demand the regulation of lead and zinc smelting works in Canada as public utilities, and will advocate such works being taken over by the Govern-

ment, if necessary, to ensure that Canadian smelting charges on similar classes of ore shall not in any case be higher than those of custom smelteries in the United States, realizing that Governmental action of this nature is absolutely necessary to conserve the mining industry of Canada and to stimulate the production of silver, lead and zinc ores from mines in British Columbia. A petition will also be prepared for presentation to the Dominion Government, along the lines indicated, such petition to be circulated for signature throughout the Province, with a view to obtaining legislative relief during the forthcoming session."

East Kootenay.

Published figures show the production of coal from mines in the Crowsnest district, Southeast Kootenay, to have been 75,162 long tons during the month of January, as compared with 35,698 tons in the corresponding month of 1917.

Production of ore from metalliferous mines in the district, as shown by receipts at the Consolidated Mining and Smelting Co.'s works at Trail during 52 days of 1918, to February 21, inclusive, was 11,058 tons. Of this total, 10,069 tons was zinc ore from the Consolidated Co.'s Sullivan mine, 113 tons lead-silver ore from its St. Eugene mine, 812 tons silver-lead ore from the Paradise mine in Windermere division, and 64 tons from several small shippers.

West Kootenay.

Ainsworth.—Only one mine in Ainsworth camp had shipped ore to Trail in 1918 up to February 21, namely, the Consolidated Co.'s No. 1 mine, which made an output of 916 tons of silver ore.

The Bell mine, in Jackson basin, in the western part of Ainsworth mining division, during the same period shipped to Trail 183 tons of zinc ore, and the Lavinia, situated north of the northern end of Kootenay Lake, sent in 32 tons of ore.

Slocan.—It is claimed that at no previous time in the history of mining in Slocan district have similar conditions prevailed, since a number of mines have ore to ship, but cannot find a market for it at remunerative rates. The year's receipts at Trail from Slocan mines, to February 21, have totalled only 1,998 tons, of which 967 tons was from the Surprise, which now has two concentrating plants, and 795 tons was chiefly zinc ore from the Lucky Jim mine. This left only 236 tons received at Trail during seven weeks from all other mines in Slocan and Slocan City divisions.

Nelson.—Work has been resumed at the Consolidated Co.'s Molly Gibson mine, at the head of Kokanee creek, in the northeastern part of Nelson mining division, and in the third week of February 147 tons of silver-lead ore from that mine was received at Trail. The Beasley-Monarch, situated about ten miles downriver from Nelson, has shipped two cars, 52 tons, of copper ore to Trail this year. The Emerald, near Salmo, in the southern part of the division, which in the latter half of last year opened a fine shoot of lead ore, is again shipping to Trail, receipts in recent weeks having totalled 138 tons.

Rossland.—The total quantity of ore received at Trail from Rossland mines in seven weeks ended February 21 was 29,083 tons, of which 1947 tons was from the Josie group of the Le Roi No. 2, Ltd., and the remainder from the Consolidated Co.'s mines, as follows: Centre Star-War Eagle group, 13,796 tons; Le Roi, 12,656 tons, and White Bear, 684 tons.

Boundary.

Both the Granby Company and the Canada Copper Corporation continue to operate smelting works at

Grand Forks and Greenwood respectively, but no particulars of quantities of ore smelted are obtainable. Both receive custom ores, but their main supply comes from mines operated by themselves.

Shipments of copper-gold ore from the Consolidated Co.'s Emma Mine, near Eholt, have this year reached Trail to a total of 5,613 tons to February 21.

Yale.

The output of coal from mines in Nicola Valley was 16,151 long tons for the month of January, which total is a little smaller than for the corresponding month of 1917.

Little productive metal mining is being done in this district at present. The only mine known to be making shipments of ore is the Iron Mask, near Kamloops, from which 540 tons of copper ore was received at Trail during four weeks to February 21.

Coast.

Production of coal from Vancouver Island mines was smaller in January of this year than in the corresponding month of 1917. Published figures give the output for last January as having been 139,442 long tons, as compared with 145,480 tons for January, 1917.

The following information concerning the Howe Sound Company, which owns the Britannia Mining and Smelting Company, was published lately in Seattle: "Much interest has been expressed regarding the 1917 earnings of the Howe Sound Company, but it is officially announced that particulars will not be available for publication until after the annual meeting, which will be held on March 18. During 1916, the Howe Sound Company produced 16,288,835 lbs. of copper and earned \$1,574,860. From official sources, it is learned that the company made no particular effort to increase production during 1917, preferring to devote considerable time and attention to increasing the ore reserves, which it is believed will be shown to have been about 5,000,000 tons greater at the end of 1917 than at the end of 1916. It is understood that the gross earnings during 1917 have been running ahead of the showing made in 1916, but, in view of the large amount of development work the company has carried out, net profits may not be quite as large as those of a year ago."

NORTHERN ONTARIO.

Geological Structure of Kirkland Lake Area.

The mine operators of Kirkland Lake are considering a plan whereby a general study of the geological structure of that area can be made. Sufficient underground work has been accomplished along the main auriferous zone to make possible a comprehensive estimate of the various faulting, dips and depths of various formations, and their relation to the mineral deposition. The Kirkland Lake area has now passed the prospective stage, with three mills in the camp now producing. It is interesting to note the rapid development which has taken place in the camp during the past two years, when the adverse conditions caused by the war had to be contended with. Whether or not the camp is to be a large one remains for the future to decide. The plan to make a comprehensive study of the geological structure of the district is an important one for the Kirkland lake camp. The two most vital necessities for the carrying out of this work, will be a mutual co-operation of the mine operators of the

camp in permitting access to their lower workings and the agreement upon a geologist whose selection will be unanimously endorsed by all the interested parties.

Tough-Oakes.

Operations at the Tough-Oakes mine at Kirkland Lake have recently been attended with highly satisfactory results. During the past week in the course of drifting on a large vein at the 350-ft. level of the mine, a new vein was encountered. The new vein where cut carries values as high as \$150 to the ton, but the general average of the whole vein is said to be about \$20 per ton. The composition of the vein resembles that of the other high grade veins in the mine and the gold appears in finely decimated particles sometimes visible to the naked eye and sometimes in the form of tellurides. This recent development is one of the most important at the Tough-Oakes for a considerable time. Working forces at this mine are better than for some time past, which fact coupled with the favorable results of development is making possible the feeding of the mill at almost full capacity, as well as the development of surplus ore. During the past year the dividends paid by the Tough-Oakes amounted to \$65,187, making a total to date of \$391,125. The ore reserves of the mine are large and the grade sufficiently high to permit of a fair margin of profit even under the adverse conditions which are being encountered by gold mining companies due to the high cost of material and the scarcity of labor. The auriferous zone so far developed consists of thirteen high grade veins, developments on which have not been carried below the 500-ft. level. However, the geological structure as so far determined strongly indicates a continuation of the veins to deeper levels, and the Tough-Oakes would appear to be in line for a prosperous future.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 17 cents per lb.
Mar. 11, 1918—(Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 9½ cents per lb.
Tin, 98 cents per lb.
Antimony, 17 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 31 cents per lb.
Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Mar. 11, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$10.00 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York cents.	London pence.
Feb. 22	—	42¼
Feb. 23	85¾	42¼
Feb. 25	85¼	42¼
Feb. 26	85¼	42¼
Feb. 27	85¼	42¼
Feb. 28	85¼	42¼
Mar. 1	85¼	42¼
Mar. 4	85¼	42¼
Mar. 5	85¼	42¼
Mar. 6	85¼	42¼

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following quotations on the Standard Stock & Mining Exchange, as of close, March 8, 1918.

	Gold.	Bid.	Asked.
Apex .....		.04 $\frac{3}{8}$	.04 $\frac{3}{4}$
Boston Creek
Dome Extension .....		.09 $\frac{3}{4}$	.10 $\frac{1}{2}$
Dome Lake .....		.23	.24
Dome Mines		8.25	8.50
Imperial .....		.01 $\frac{5}{8}$	.02
McIntyre		1.38	1.39
Hollinger		5.00	5.05
New Ray .....		.17	.18
Preston East Dome .....		.03 $\frac{1}{2}$	.04
Teck-Hughes55
West Dome .....		.12 $\frac{1}{2}$	.12 $\frac{3}{4}$
Porcupine Crown .....		.18	.20
Vipond .....		.20	.25
	Silver.	Bid.	Asked.
Adanac .....		.08 $\frac{1}{2}$	.09 $\frac{1}{4}$
Beaver .....		.27	.28
Coniagas		3.25	..
Crown Reserve .....		.21	.22
Ferland .....		.09 $\frac{1}{2}$	..
Hargraves .....		.06 $\frac{1}{4}$	.06 $\frac{1}{2}$
Hudson Bay	37.00
Kerr Lake		5.30	5.60
La Rose .....		.30	..
McKinley .....		.46 $\frac{3}{4}$	.47
Nipissing		8.45	8.55
Temiskaming .....		.26 $\frac{1}{2}$	.28
Trethewey .....		.15 $\frac{3}{4}$	.16
Wettlaufer .....		.05	.05 $\frac{1}{2}$

Locomotive Bargains

Immediate Delivery

- 1—45 ton standard gauge Switcher, cylinders 17 x 24, 135 lb. steam pressure; haulage capacity 2,741 tons.
- 2—40 ton standard gauge Switchers, cylinders 18 x 26, 140 lb. working pressure; haulage capacity 2,500 tons.
- 1—30 ton standard gauge Switcher, cylinders 14 x 24, 135 lb. steam pressure; haulage capacity 1,898 tons.
- 1—35 ton standard gauge Switcher, cylinders 14 x 24, 140 lb. steam pressure; haulage capacity 1,982 tons.
- 1—38 ton standard gauge Road Engine, cylinders 16 x 24, 140 lb. steam pressure; haulage capacity 1,443 tons.
- 2—50 ton standard gauge Road Engines, cylinders 17 x 24, 150 lb. steam pressure; haulage capacity 1,812 tons.
- 1—28 ton standard gauge Road Engine, cylinders 17 x 24, 150 lb. steam pressure; haulage capacity 980 tons.
- 1—45 ton standard gauge Road Engine, cylinders 17 x 24, 140 lb. steam pressure; haulage capacity 1,521 tons.
- 1—45 ton standard gauge Mogul, cylinders 17 x 26, 140 lb. steam pressure; haulage capacity 2,313 tons.

All above Locomotives in first-class operating condition and for immediate shipment.

Write us for fuller specifications and prices. These are the lowest offerings in the market to-day.

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Made in 7 sizes, from 10 to 50 Horse Power, with one drum or two drums, any diameter desired. Supplied with Boiler, as shown, or without Boiler. Mine Hoists made also suitable for Electric or Gasoline Drive.

Catalogue on request.



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We make and catalogue a great variety of Mine Cars, End Dump; Side Dump; Revolving, to dump either way. We list these in many sizes and for various gauges of tracks and at reasonable prices.

We are also open to make to order: Any Design of Mine Car or Bucket to Customer's Specifications.

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MARSH ENGINEERING WORKS Ltd., Belleville, Ont.

NEW YORK MARKETS.

Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 7.25.

Lead, outside, nominal, 7.50 to 7.75.

Spelter, prompt western shipment, 7.67½ to 7.80.

Antimony—

Chinese and Japanese, nominal, 13.37½ to 13.62½.

Aluminum—nominal.

Aluminum—Government price, 50 ton lots f.o.b. plant:

No. 1 Virgin, 98-99 per cent., 32.00.

Powdered Aluminum, 75.00 to 85.00.

Metallic Magnesium—99 per cent. plus \$2.00 to \$2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, 125.00.

Platinum (pure), \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic) \$3.25 to \$3.50.

Tungsten—

Scheelite, 26.00.

Wolframite, 20.00 to 24.00.

Gravel Flourspar: f.o.b. mines—

Prompt, \$35.00 to \$40.00.

Contract, year 1918, \$25.00 to \$28.00.

Silver (official), 85½.

Metal Products.—The following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices.

Hot rolled, 31.50 to 33.00.

Cold rolled, 32.50 to 34.00.

Copper bottoms, 39.50 to 41.00.

(Shipments from stock 2c per lb. extra).

Copper rods—Base prices.

Round, 32.50.

Sq. and rectangular, 33.50.

Copper wire—Base prices.

nominal, 27.00.

Brass Products—Base prices.

High brass—

Sheets and wire, 26.75 to 27.50.

Rods, 24.75 to 26.75.

Low brass—

Sheets and wire, 30.00 to 32.00.

Rods, 30.75 to 32.75.

Brazed tubing—

Brass, 34.75 to 36.75.

Bronze, 39.75 to 41.75.

Seamless tubing—Base prices.

Brass, 35.50 to 37.50.

Copper, 38.00 to 40.00.

Bronze, 42.50 to 43.50.

Full lead sheets, 9.25.

Cut lead sheets, 9.50.

Sheet zinc, f.o.b. smelter, 15.00.

Oxy-Acetylene Welding and Cutting



Defective Forgings Are Rescued From The Scrap Pile.

Many manufacturers are throwing away a large portion of their earnings, and decreasing their profits, by allowing defective metal parts to be junked.

In a prominent drop forge works, forgings having minor defects are made perfect by the Prest-O-Lite Process of Oxy-acetylene welding. The forgings shown above are valued at \$1.50 each, and are reclaimed at a cost of a few cents.

For all metal manufacturing work and repairs—wherever two pieces of metal are to be joined—the Prest-O-Lite Process is usually the best and cheapest way.

Prest-O-Lite PROCESS

employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work and lower operating cost.

Apparatus consists of an equal pressure blow pipe, automatic regulators and gauges, and all necessary equipment. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe.

Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any average workman who understands metals can learn the welding process quickly and easily.

We will gladly send illustrated literature and interesting data showing actual instances of savings made by others. It may suggest valuable ideas to you. Write for it.

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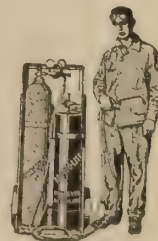
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World's Largest Makers of Dissolved Acetylene



The Dominion Income War Tax

ITS MEANING AND APPLICATION

THE Dominion Income War Tax Act, passed at the last session of Parliament is now in force and all those liable to taxation under the provisions of the Act must file the required returns for the year 1917, on or before 31st March, 1918.

The Act provides that there shall be assessed, levied, and paid upon the 1917 income of every person residing or ordinarily resident in Canada, a tax upon income exceeding \$1500 in the case of unmarried persons and widows or widowers without dependent children, and upon income exceeding \$3000 in the case of all other persons.

Corporations and joint stock companies carrying on business in Canada, no matter how created or organized, shall pay the normal tax upon income over \$3000. The fiscal year of corporations and joint stock companies may be adopted if desired.

Your Immediate Obligation.—You are now required by law to fill out in triplicate, one or more of the five special forms enumerated below. Read the particulars about the forms provided, then note the form or forms that fit your case. Don't forget to make three copies. You keep one copy, and in the case of Forms T1 and T2, deliver two to the Inspector of Taxation for your district. In the case of Forms T3, T4 and T5, two copies must be filed with the Commissioner of Taxation at Ottawa.

Penalties.—Default in filing returns renders the person or persons liable on summary conviction to a penalty of one hundred dollars for each day during which the default continues. Any person making a false statement in any return or in any information required by the Minister of Finance shall be liable on summary conviction to a penalty not exceeding ten thousand dollars or to six months imprisonment, or to both fine and imprisonment.

FORMS TO BE FILLED IN AND FILED

Individuals.—Form T1 is for all individuals having the requisite income. Fill in pages 1, 2 and 3, make no marks on page 4.

In giving particulars of dividends received, state amount received from each company, listing Canadian and Foreign Companies separately.

Partnerships as such need not file returns, but the individuals forming the partnerships must.

Corporations and Joint Stock Companies must fill in Form T2, showing total income. Amount paid during the year to Patriotic and Canadian Red Cross Funds, and other approved war funds, should be shown under Exemptions and Deductions. A financial statement should also be attached. In giving particulars of dividends received, state amount received from each company, listing Canadian and Foreign Companies separately.

Trustees, Executors, Administrators of Estates and Assignees use Form T3, to state particulars of the distribution of income from estates they are handling. A separate form is required for each estate and total incomes must be given as well as distribution thereof.

Employers. On Form T4 employers shall make a list of the names of employees and amounts paid to each in salaries, bonuses, commission, or other remuneration wherever the combined sum of such remuneration for the calendar year 1917 amounted to \$1000 or more. This applies to all classes, regardless of number of such employees.

Corporations Listing Shareholders.—Corporations and Joint Stock Companies shall list on Form T5 Shareholders residing in Canada to whom Dividends were paid during the calendar year 1917, stating the amounts of dividends and bonuses paid to each.

Don't wait till the last minute. Get the necessary forms now, and make your information accurate and complete.

Forms may be obtained from the District Inspectors of Taxation and from the Postmasters at all leading centres.

*Postage must be paid on all letters
and documents forwarded by mail
to Inspector of Taxation.*

DEPARTMENT OF FINANCE

OTTAWA, CANADA



Who used the WILFLEY TABLE when Butte was a boom town?

Ask the oldest concentrator-man you know, what was the first successful table, and he'll tell you it was the

WILFLEY TABLE

The WILFLEY was in use in more than a score of mines when Butte was a boom-camp—and that was twenty years ago.

The WILFLEY is still the leading concentrator. The Wilfley engineers have kept ahead of development. Many improvements have been made in the mechanical construction, and the riffing systems have been improved to give increased capacity and cleaner separation. The No. 1623 and No. 10 riffing systems give unusually large capacity combined with close separation.

There is a WILFLEY to meet every requirement, from that of the ten-ton plant to the big mill using hundreds of tables.

The latest WILFLEY combines great capacity with extreme simplicity of design; has the improved head motion and riffles; easily adjustable wash-water and feed-box; improved tilting device; steel frame with slipper bearings; and new draw-bar which distributes strain over all three pressed-steel stringers.

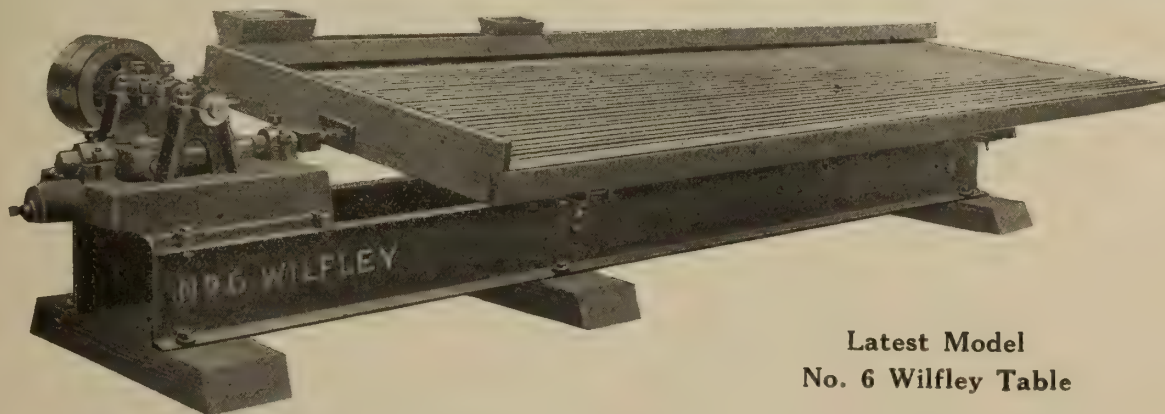
Write for details, mentioning nature and tonnage of ore.

Following are some of the mills which have used WILFLEY TABLES

for nearly 20 years.

Caribou Mine	Boulder, Colo.
Tomboy Mine	Telluride, Colo.
Granite Bi-Metallic M. Co.	Phillipsburg, Mont.
Sunnyside Mine	Eureka, Colo.
Parrott Silver M. Co.	Butte, Mont.
Cornucopia Mine	Baker City, Ore.
Anaconda Copper Co.	Anaconda, Mont.
Detroit Copper M. Co.	Morenci, Ariz.
Des Loge Cons. Lead Co.	Des Loge, Mo.
Liberty Bell G. M. Co.	Telluride, Colo.
Silver Lake Mine	Silverton, Colo.
Guanajuato Cons. M. & M. Co.	Guanajuato, Mex.
Quincy M. Co.	Hancock, Mich.
Calumet & Hecla M. Co.	Calumet, Mich.
Wolverine Copper M. Co.	Houghton, Mich.
Arizona Copper Co.	Clifton, Ariz.

NOTE—They are still using the Wilfley as the most modern and up-to-date table.



Latest Model
No. 6 Wilfley Table

Manufactured in Canada by Wabi Iron Works, New Liskeard, Ont., Canada

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Wilfley Tables, Marcy Mills, Assay and Laboratory Equipment and Supplies, Electric Apparatus, General Mining Machinery, Mill Equipment

CANADA

DEPARTMENT OF MINES

HON. MARTIN BURRELL, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

(Signed) J. M. Callow.



*The Babbitt Metal that's at the
Front in Efficiency and Economy*

HARRIS HEAVY PRESSURE

The Aristocrat of Babbitts

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		Steel Drums— Smart-Turner Machine Co.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
			Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
			Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.

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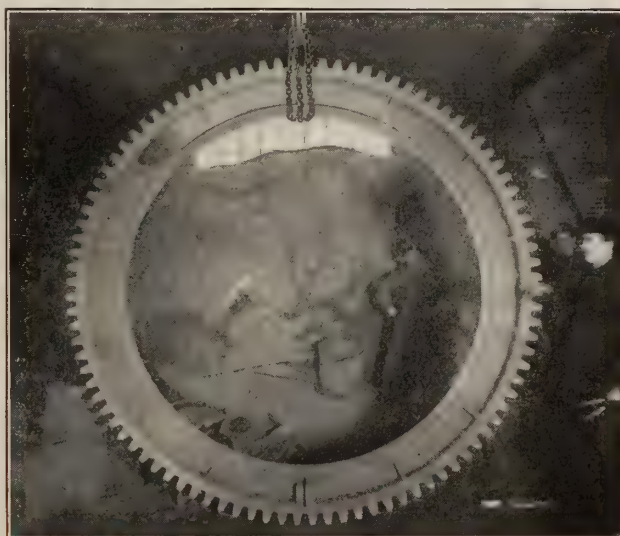
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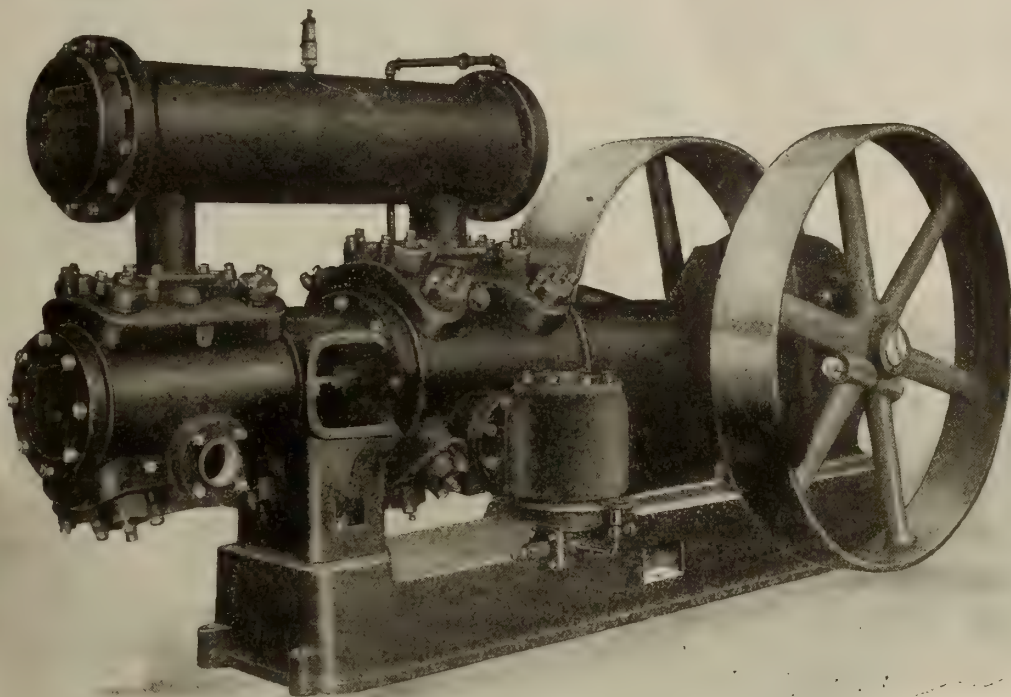
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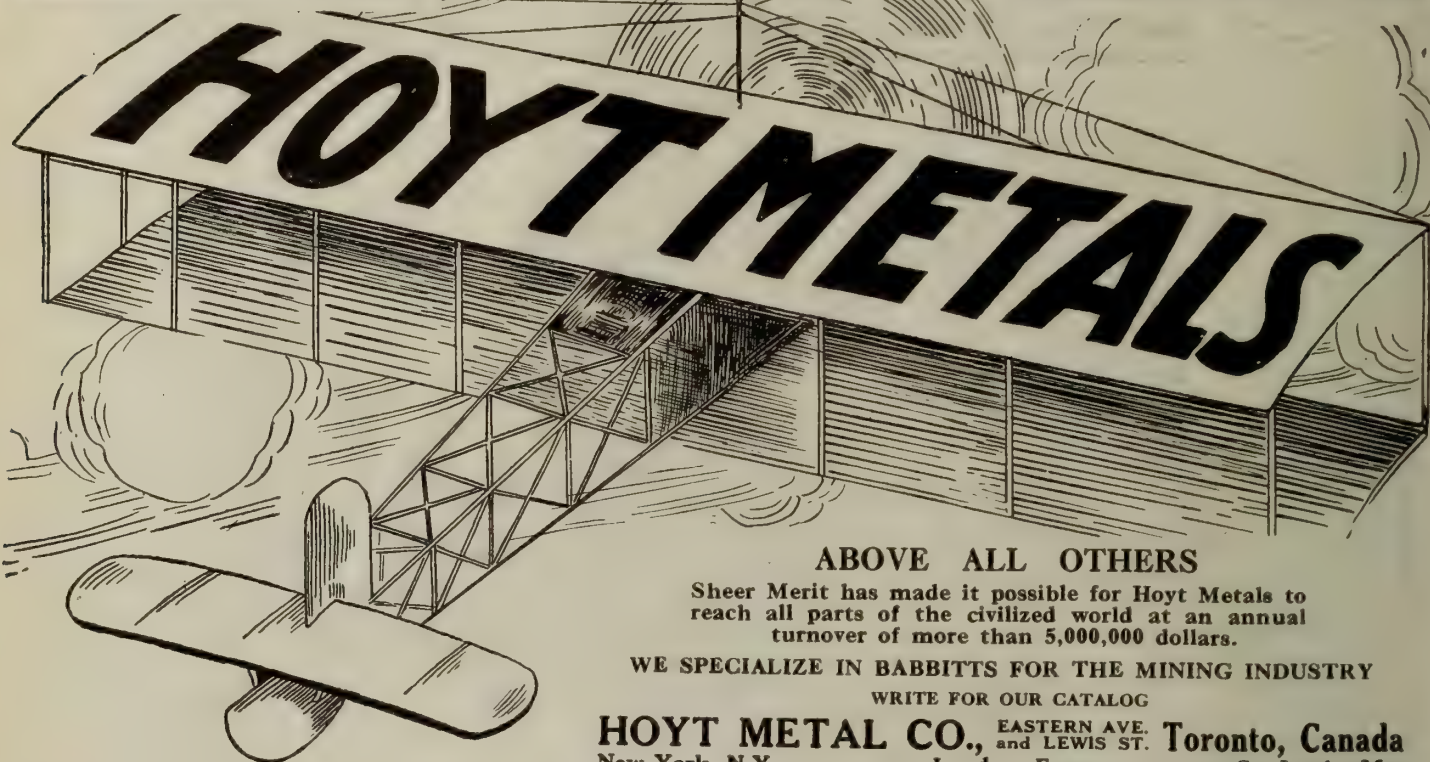
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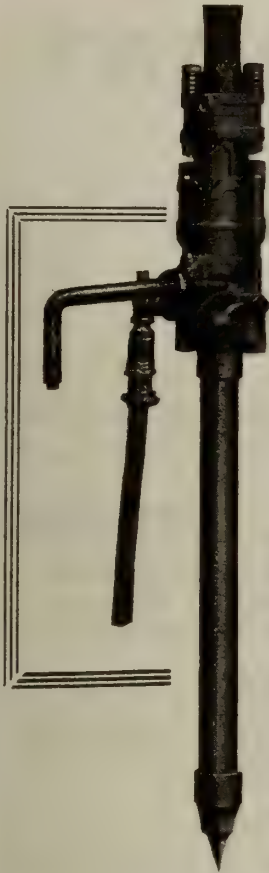
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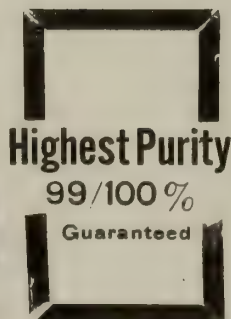
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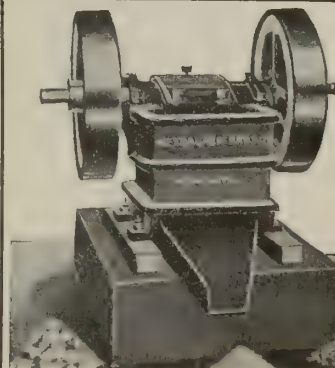
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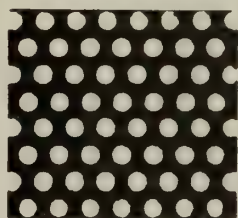
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THE INCOME WAR TAX ACT

Forms giving particulars of income for the year 1917, must be filled in and filed on or before the 31st March, 1918

Section 4 of the Act provides that all persons resident or ordinarily resident in Canada, shall pay a tax upon income exceeding \$1500 in the case of those single and widows and widowers without dependent children, and upon income exceeding \$3000 in the case of all other persons. It also provides that all Corporations and Joint Stock Companies, no matter how created, shall pay the normal tax upon income exceeding \$3000.

The Forms provided by the Department of Finance to be filled in with particulars of the 1917 income of all those whose incomes are liable under the Act, and by Trustees, Corporations and Joint Stock Companies, with information required of them, may be obtained from the District Inspectors of Taxation and from the Postmasters at all leading centres.

Forms to obtain and Special Features to observe

Individuals—Get Form T 1 to give particulars of their own incomes. In stating Dividends received, give the amount from each Company, listing Canadian and foreign Companies separately. Fill in pages 1, 2 and 3 only. Do not mark on page 4.

The following sample answers, (printed in *italics*) to questions asked on pages 2 and 3 of Form T 1, will help you to fill in correctly your copies of the Form.

PAGE 2. DESCRIPTION OF INCOME.

GROSS INCOME DERIVED FROM—

1. Salaries and wages.....	<i>None</i>.....	..
2. Professions and vocations.....	<i>None</i>	—
3. Commissions.....	<i>from sale of Real Estate</i>	\$1000
4. Business, trade, commerce or sales or dealings in property, whether real or personal.....		7500
5. Farming (Horticulture, dairying or other branches)	<i>None</i>	—
6. Rents.....		750
7. Dividends (A). Canadian Corporations—		
<i>Standard Transportation Company Ltd</i>		25
<i>Rainbow Mining Company Ltd</i>		150
(B) Foreign Corporations—		
<i>New York Trading Company</i>		15
<i>Albany Tool Company, Inc.</i>		60
8. Interest on notes, mortgages, bank deposits and securities other than reported in item 7—		
<i>Interest on Mortgages</i>		72
<i>Bank Interest</i>		21
<i>1200 Par Value Bonds of Jones Paint Co. Ltd.</i>		72
<i>1000 Municipal Debentures, Town of Midvale</i>		55
9. Fiduciaries, (Income received from guardians, trustees, executors, administrators, agents, receivers or persons acting in a fiduciary capacity)—		
<i>Income (not capital) from Estate of Andrew Doe (People's Trust Company, Executor)</i>		315
10. Royalties from mines, oil and gas wells, patents, franchises and other legalized privileges.....	<i>None</i>	—
11. Interest from Dominion of Canada Bonds, issued exempt from Income Tax \$3,000.....		150
12. Other sources not enumerated above—		
<i>½ Interest in Shaw Hardware Company Partnership</i>		750
13. Total Income.....		\$10,941

EXEMPTIONS AND DEDUCTIONS

PAGE 3

AMOUNT CLAIMED FOR—

14. Depreciation... <i>On Store Building (not land), (Brick)</i> ..	\$ 125
<i>On Equipment, used in business</i>	140
<i>Store Fixtures</i>	100
15. Bad debts, actually charged off within the year.....	40
16. Allowance for exhaustion of mines and wells... <i>None</i>	—
17. Contributions actually paid to the Patriotic and Canadian Red Cross Funds and other approved War Funds..... <i>Patriotic and Canadian Red Cross</i>	250
18. Interest paid on monies borrowed and used in the business..... <i>Mortgage on Store Property, \$1,000</i> ...	60
19. Federal, Provincial and Municipal taxes on property used in the business— <i>General Municipal Taxes</i>	180
20. Interest from Dominion of Canada Bonds, issued exempt from Income Tax.....	150
21. Other claims for deductions must be specified in detail— <i>Business Operating Expenses</i> <i>Repairs (stating particulars)</i>	4200 150
22. Total Exemptions and Deductions.....	\$5395
23. Amount paid under Business Profits War Tax Act, 1916, which accrued in the 1917 accounting period..... <i>Year ending December 31, 1917—None</i> .	

I hereby certify that the foregoing return contains a true and complete statement of all income received by me during the year for which the return is made.

Date.....*15th March, 1918*.

Signature.....*John Brown*.

Corporations and Joint Stock Companies. Use Form T2—giving particulars of income. Also attach a financial statement. Under Deductions, show in detail amounts paid to Patriotic Fund and Canadian Red Cross or other approved War Funds.

Trustees, Executors, Administrators of Estates and Assignees use Form T3. Full particulars of the distribution of income from all estates handled must be shown as well as details of amounts distributed. A separate Form must be filled in for each estate.

Employers must use Form T4 to give names and amounts of salaries, bonuses, commissions and other remuneration paid to all employees during 1917 where such remuneration amounted in the aggregate to \$1000 or over.

Corporation Lists of Shareholders.—On Form T5 corporations shall give a statement of all bonuses, and dividends paid to Share-

holders residing in Canada during 1917 stating to whom paid, and the amounts.

Penalties.—Default in filing returns renders the person or persons liable on summary conviction to a penalty of one hundred dollars for each day during which the default continues. Any person making a false statement in any return or in any information required by the Minister of Finance shall be liable on summary conviction to a penalty not exceeding ten thousand dollars or to six months imprisonment, or to both fine and imprisonment.

In the case of Forms T1 and T2, keep one copy of the filled in Form and file the other two with the Inspector of Taxation for your District. In the case of T3, T4 and T5, keep one copy and file the other two, with the Commissioner of Taxation, Dept. of Finance, Ottawa.

Forms may be obtained from the District Inspectors of Taxation and from the Postmasters at all leading centres.

Department of Finance

Ottawa, Canada

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

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The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

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Commissioner of Public Works and Mines



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MINES BRANCH

Department of Colonization, Mines and Fisheries

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

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Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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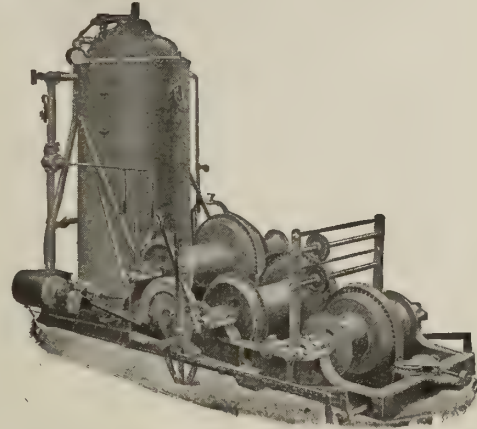
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THE CANADIAN MINING JOURNAL

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The discovery of ore in the Violet property of La Rose Consolidated may well prove to be of great importance to the company. Prospecting has been carried on by the company without much success for some time, and it has been discouraging work. Persistency is, apparently, at last to be rewarded. We hope that development will prove the existence of deposits that will give La Rose a new lease of life. As yet, no rich ore is reported to have been discovered on the Violet property; but the chances have been much improved by recent developments.

The preliminary reports for 1917 of Thos. W. Gibson, Deputy Minister of Mines of Ontario, and of Theo. C. Denis, Superintendent of Mines of Quebec, extracts from which are published in this number, show that considerable progress was made during the year 1917, in spite of many handicaps.

The fuel problem has at last attracted almost as much attention as the food problem. Coal producers two years ago attempted to arouse the public to the necessity of recognizing coal as one of the most important munitions of war. Not until recently, however, has the public been willing to believe that the statements made by the operators in the early part of the war were justified.

The peat deposits of Canada have attracted much attention; but so far have contributed very little to our fuel supply. Experimental plants have been installed and the manufacture of peat carried on; but without noteworthy success. There seems to be reason to believe, however, that an economical process of manufacture may be found; and the tests to be carried on by the Dominion and Ontario Governments may have important results.

That classes for prospectors may be of great benefit to the country is indicated by the success of the evening classes at the University of Manitoba. Last fall, one of the members of the class made what may prove to be an important discovery of molybdenite. Recently another prospector brought in specimens which were identified as scheelite, an ore of tungsten.

In this issue, we publish a paper, by Mr. A. M. Bateman, on the origin of the Sudbury nickel-copper deposits. Since Mr. Bateman's paper was written, there has been published another paper dealing with this subject. We will publish in a later issue a summary of the conclusions of H. M. Roberts and R. D. Longyear. These two papers are important contributions to the discussions on the origin of the nickel ore of the Sudbury district.

Mr. James White threatens to have his good friend Mr. Sifton raise the question as to whether the Mining Institute should continue to receive the grant from the Dominion Government. Perhaps the money might be better devoted to the making and showing of moving pictures of Mr. White giving a characteristic speech in defence of the Commission of Conservation.

Development of one of the newer gold districts in Northern Ontario will be hastened by the decision to proceed at once with the exploration of the Otisse property in Powell township. Surface samples from a number of outcrops on this property show high gold values and careful testing is likely to result in a deposit of some size being proven. Information at present is fragmentary. Scattered outcrops of rich ore are known to occur. The structure of the deposits is as yet unknown. We are pleased to learn that this attractive prospect is to be explored without delay.

Mineral Production of Ontario, 1917

By T. W. Gibson.

Deputy Minister of Mines, Ontario.

In the following table, issued subject to revision, is summarized the mineral output of Ontario for 1917. Comparative figures for 1916 are included.

Discoveries of gold continue to be made in various parts of northern Ontario. Last year one of the most promising was in the township of Rickard, some 12

Product	METALLIC:	Quantity		Value, \$	
		1916	1917	1916	1917
Gold.....	ounces	497,833	420,869	10,339,259	8,698,831
Silver.....	"	20,007,367	19,479,807	12,703,591	16,193,293
Copper.....	lbs.	157,138	542,878	33,102	119,407
Copper, in matte (a).....	tons	22,430	21,197	8,332,153	7,842,890
Nickel, in matte (b).....	"	41,299	41,887	20,649,279	20,943,500
Iron ore, exported.....	"	121,495	136,343	342,700	483,690
Pig iron (c).....	"	118,165	49,485	1,646,010	1,016,699
Cobalt (metallic).....	lbs.	328,563	396,395	288,614	589,290
Cobalt oxide.....	"	691,681	418,703	473,713	533,489
Nickel oxide.....	"	100,013	23,748	18,438	6,533
Nickel (metallic).....	"	42,411	225,480	17,847	91,923
Other Nickel and Cobalt Compounds.....	"	350,831	393,036	60,956	42,026
Molybdenite, concentrates.....	"	24,562	80,614	26,393	108,501
Lead.....	"	796,833	1,772,512	70,863	172,601
Metallic total.....				55,002,918	56,845,788
NON-METALLIC:					
Arsenic, white, grey and other forms.....	lbs.	4,320,890	5,183,145	200,103	608,483
Asbestos.....	"	500	20,000	100	2,150
Brick, fancy and pressed.....	M	31,742	35,203	318,942	462,357
Brick, common.....	"	60,441	74,129	509,559	769,340
Tile, drain.....	"	15,931	13,421	275,471	468,886
Tile, hollow blocks.....	"	4,451	3,931	176,953	301,528
Cement, Portland.....	bbbl.	2,143,949	2,063,231	2,242,433	2,934,271
Corundum.....	tons	67	188	8,763	31,213
Feldspar.....	"	12,965	6,167	42,159	27,629
Fluorspar.....	"	1,283	4,213	10,146	64,673
Graphite, refined.....	"	3,466	3,173	249,586	210,018
Gypsum, crushed, ground and calcined.....	"	36,668	48,656	116,206	128,828
Iron pyrites.....	"	175,593	257,369	471,807	1,066,575
Lime.....	bush.	1,453,254	1,179,062	265,356	269,461
Mica.....	tons	266	386	55,407	79,516
Natural gas.....	M. cu. ft	17,953,396	20,025,727	2,404,499	3,182,154
Petroleum, crude.....	Imp. gal.	6,890,681	7,104,700	387,846	475,000
Pottery.....	"			87,025	94,501
Quartz.....	tons	133,684	174,155	223,514	382,993
Salt.....	"	128,935	138,528	700,515	1,095,866
Sand and gravel.....	cu. yds.	1,265,973	1,142,481	470,963	427,303
Sewer pipe.....	"			216,749	205,810
Stone, building, trap, granite, etc.....	"			755,313	749,160
Talc, crude and ground.....	tons	11,810	16,076	111,489	179,554
Total, non-metallic.....				10,300,904	14,218,269
Add metallic.....				55,002,918	56,845,788
Grand Total.....				65,303,822	71,060,942

(a) Copper in the matte valued at 18½ cents per pound.
 (b) Nickel in the matte valued at 25 cents per pound.
 (c) Production from Ontario iron ore only.

Gold.

The adverse effects of the war fell with greater force upon the mining of gold than upon any other branch of the industry. The result of scarcity and higher cost of labor as well as of all necessary supplies cannot be transferred, as in other departments of mining, to purchasers of the product, because of the fact that gold has a fixed price. The output was consequently less by 76,935 ounces than in 1916. At the Dome mine, one of the leading Porcupine producers, milling was discontinued in November, and the difficulties of the situation doubtless diminished the output at other properties. Nevertheless, the position of the gold mining industry is essentially sound, and the lessening of production can only be regarded as temporary, pending the return of more normal times. Meanwhile, great progress is being made in the development of ore bodies, and the milling capacity at Porcupine was increased during the year by 1,500 tons daily.

The production according to source was as follows:

Source	Ore Milled tons	Gold Recovered		Gold Extraction per ton \$
		Ounces	Value \$	
Porcupine.....	1,177,928	398,257	8,229,744	6.99
Kirkland Lake.....	49,955	19,608	405,230	8.11
Rognon, St. Anthony, Croesus, Miller-Independence and Cordova Mines.....	2,656	2,974	62,636	...
Gold in copper ore.....	.....	59	1,221	...
Total.....	1,230,539	420,893	8,698,831	...

miles west of Lake Abitibi, where a Finn named John Raty, staked out a claim on lot 7 in the fourth concession. At 5 feet in depth, the vein shows very coarse gold accompanied by tellurides and other minerals in a milky-white quartz. Another excellent prospect was located by a prospector named Cochenour near the head waters of the Lightning River, a small stream falling into Lake Abitibi from the south. The gold area in Powell and Cairo townships, about 3 miles west of Fox rapids on the Montreal river, has attracted considerable attention. Adjoining the Davidson claims, where the original discovery was made, some stakings made by Sam Otisse contain, it is reported, very wide bands of schist and porphyry, both highly auriferous. In all these areas there is likely to be much activity next season, although the expansion of the gold fields of the Province is to some extent awaiting the return of the prospectors who in large numbers offered their services to their country, and are now somewhere in France.

In addition to the recovery given above, the gold ores yielded 76,223 ounces of silver worth \$61,274, and 2,032 pounds of copper valued at \$552.

The total yield of gold in Ontario to the end of 1917 amounted to \$42,362,479.

The chief producers in 1917 are enumerated in the following table:

Company	Ore milled tons	Gold recovered	
		ounces	value \$
Hollinger Consolidated Gold Mines, Limited.....	514,301	204,810	4,233,777
McIntyre-Porcupine Mines, Limited.....	175,893	81,827	1,696,126
Dome Mines Company, Limited.....	359,570	71,193	1,471,705
Porcupine-Crown Mines, Limited.....	39,111	18,180	375,766
Tough-Oakes Gold Mines, Limited.....	38,695	16,384	338,593
Porcupine V.N.T. Gold Mines, Ltd.....	34,971	10,416	208,350
Schumacher Gold Mines, Limited.....	37,323	9,551	197,413
Teck-Hughes Gold Mines, Limited.....	11,257	3,181	65,753

Silver.

As the table of production shows, the Cobalt mines fell short of the yield of 1916 by about 500,000 ounces, a much smaller falling-off than in the latter year, when the decrease as compared with 1915 was 4,800,000 ounces. On the other hand, the decided increase in the price of silver made the return to the mine owners greater than in 1916 by nearly $3\frac{1}{2}$ million dollars. The increase in the value of silver has naturally been of great advantage, not only to the mining companies at Cobalt, but also to their employees, whose wages automatically advance with the price.

Mining Corporation of Canada now leads in production by virtue of the rich system of veins situated in part beneath the streets and buildings of the town of Cobalt. Nipissing, which maintains its production well, follows, succeeded by Kerr Lake. The mines shipping over one million ounces were Mining Corporation, Nipissing, Kerr Lake, Crown Reserve, O'Brien, Miller Lake-O'Brien and McKinley-Darragh-Savage. The first mentioned shipped 4,546,065 ounces. A new shipper was Adanac, situated southwest of the Temiskaming. Developments at a near neighbor, the Ophir, lying south of the Adanac, are encouraging.

Since the discovery of silver at Cobalt in 1903 shipments from the camp and outlying silver areas have been as follows:—

	Average price, cents per ounce	Ounces	Value \$
1904.....	57.2	206,875	111,887
1905.....	60.4	2,451,356	1,360,503
1906.....	66.8	5,401,766	3,667,551
1907.....	67.5	10,023,311	6,155,391
1908.....	52.9	19,437,875	9,133,378
1909.....	51.5	25,897,825	12,461,576
1910.....	53.5	30,645,181	15,478,047
1911.....	53.3	31,507,791	15,953,847
1912.....	60.8	30,243,859	17,408,935
1913.....	57.8	29,681,975	16,553,981
1914.....	54.8	25,162,841	12,765,461
1915.....	49.69	24,746,534	12,135,816
1916.....	65.661	19,915,090	12,643,175
1917.....	81.417	19,401,893	16,131,013
Total.....		274,724,172	151,960,561

It will be noted from the above figures that the decline in silver production since 1911 has been much less rapid than the rise prior to that date.

The production according to source was as follows:—

	Ounces
Cobalt.....	18,327,258
South Lorrain.....	10,000
Gowganda.....	1,064,635
Silver recovered from gold and copper ores.....	77,914
Total.....	19,479,807

Ontario's Leading Gold Producers in 1917.

Some properties at which operations had ceased came again into production; these include the Trethewey and Cobalt Provincial. The lower diabase contact reached at depth in the Temiskaming and Beaver mines showed some ore, but on the whole was disappointing. In Gow-

ganda the Miller Lake-O'Brien mine produced largely from the high-grade vein opened up in 1916, and this has led to development work being undertaken on nearby locations. A new find of rich silver ore was made by Hugh Miller Kell in the township of Corkill, some 12 miles southeast of the Gowganda deposits. This discovery has not yet been fully developed.

The flotation process for the concentration of dump and low-grade ore is now pretty well established at Cobalt, although there has been some reaction against it. The results so far have been unequal, and the reduction of the concentrates offers difficulties; besides, the position as regards the alleged German ownership of the patents and the excessive royalties with which the mining companies feared they were to be saddled, has not yet been satisfactorily cleared up.

Refineries.—Shipments abroad of ore and concentrates are on the decline. In 1917 United States refineries treated 1,912 tons of ore and 4,396 tons of concentrates, producing therefrom 2,914,267 ounces of silver. The proportion of the silver output refined in the Province was therefore about 80 per cent.

The Deloro, Thorold and Welland refining plants treated 7,964 tons of silver-cobalt-nickel arsenides, recovering 6,450,075 ounces of silver worth \$5,288,739. Year by year a larger proportion of cobalt and nickel oxides are being treated for production of the metals, and also for a variety of cobalt and nickel salts. The figures given for cobalt metal include 81,068 pounds used in the manufacture of stellite, a cobalt-chromium-tungsten alloy used for making high-speed cutting tools. Nickel sulphate and cobalt, both as carbonate and sulphate, are produced by Metals Chemical, Limited. Nickel sulphate is coming into important use for the hydrogenization of oils and fats in the manufacture of soap, oleomargarine, etc. Unseparated cobalt and nickel oxides were marketed in small quantities only. The great use of cobalt as coloring in the ceramic trade, bids fair to be rivalled by its new employment in the metallic form.

Nickel and Copper.

The output of nickel-copper matte in 1917 was 78,897 as compared with 80,010 tons in 1916. The nickel content, 41,887 tons, was greater, but the copper content, 21,997 tons, less than in that year, which may be explained by the fact that the bulk of the Canadian Copper Company's production was from the Creighton mine, the ore of which is well known to contain much more nickel than copper. During the year, 1,453,661 tons of ore were smelted at the Copper Cliff and Coniston smelters. Besides the Creighton mine, the Canadian Copper Company operated the Crean Hill and No. 2, while the Mond Company drew ore from Victoria, Garson, Levaek and Worthington; also silicious copper ore from Bruce Mines. Alexo shipped its output to the Mond Company.

The Royal Ontario Nickel Commission in its report on the nickel industry, issued early last year, estimated the known reserves of nickel ore as 70 million tons, but it is believed that the results of diamond drilling since

the issue of the report have added nearly 100 per cent. to the quality. Explorations at the Levaek, Frood Extension, Murray and Falconbridge deposits have much extended the limits of the ore bodies. The refinery of the International Nickel Company of Canada at Port Colborne is well on the way to completion. It will have a capacity of about 10,000 tons of nickel per annum, and a relative quantity of copper.

Although the nickel-copper mines of Sudbury are the chief source of copper in Ontario, there are other deposits of non-nickeliferous copper ore from which shipments of ore and concentrates were made in 1917 to the extent of 4,173 tons, containing 431,402 pounds of copper, valued at \$89,380. Shippers were H. H. Wood, Mine Centre; Hudson Copper Company, Havilah; Kenyon Copper Mines, Massey; Tip-Top Mine, Kashabowie; Jos. Errington, Gogama station, Can. Nor. Ry.; and Sudbury Copper Company, Iron Bridge. In addition, 110,476 pounds were recovered from silver ore and gold slag treated in United States refineries. On the Hudson Copper Company's property in Galbraith township a handsome showing of copper glance has been uncovered. The average price of copper in 1917 was 27.18 cents (Eng. and Mining Journal) as compared with 27.20 cents in 1916. Since 21st September the price has been as fixed by the United States government, 23½ cents per pound f.o.b. New York.

Iron Ore and Pig Iron.

From three producing mines there were raised and marketed 176,833 tons of iron ore. Of this quantity, 136,343 tons were exported to the United States, the remainder being sent to blast furnaces in the Province. The mines raising ore were Moose Mountain, Magpie and Helen, the first-named belonging to the company of that name, and the last two to Algoma Steel Corporation, Limited. The Helen mine ships to the Magpie, where the ores from the two mines are mixed and treated in the roasting furnaces to produce a Bessemer grade of ore. From Moose Mountain shipments were in the form of concentrates and briquettes.

Blast furnaces at Sault Ste. Marie, Hamilton, Port Colborne and Deseronto smelted 94,318 tons of Ontario ore and 1,221,881 tons of imported ore, the product being 691,233 tons of pig iron valued at \$14,201,695. It may be stated that only 7.15 per cent. of the value of the pig iron output can be credited to domestic ore.

Molybdenum.

Molybdenum ore treated in 1917 at the concentrators of the International Molybdenum Company at Renfrew, Renfrew Molybdenum Mines at Mount St. Patrick, and the Mines Department at Ottawa, totalled 692 tons. From this ore 80,614 pounds of concentrates were produced worth \$108,501. The molybdenum contents of the concentrates varied from 52.9 to 93.5 per cent. of MoS₂.

From the plants of the International Molybdenum Company at Orillia and Tivani Electric Steel Company at Belleville, there was a production of 149,000 pounds of ferro-molybdenum valued at \$348,775.

Molybdenum is one of the metals to which, because of its use for making high-speed tool steel, the war has lent much importance. During 1917 there was an embargo on shipments of molybdenum from Canada to the United States. At the beginning of 1918, this was lifted, and shipments may now be freely made under license permit. Prices ruling in the United States have been much higher than those paid by the Imperial Munitions Board. It is hoped that the better market will stimulate production.

Non-Metallic.

The value of the output of non-metallic products for 1917 was greater than in any preceding year except 1913, when it amounted to \$15,724,376. Of the 24 items in the non-metallic list only five, compared with 1916, show decreased production in quantity, namely, drain tile, hollow building blocks, graphite, lime, sand and gravel. In valuation, decreases are shown by graphite, sand and gravel, sewer pipe and stone. For practically all products prices have advanced materially; this has notably been the case with arsenic, fluorspar and iron pyrites. The Northpines and Gondreau mines of the Nichols Chemical Company each shipped over 100,000 tons of iron pyrites. Fluorspar is in great demand by the steel plants, the entire production being from Madoc. Building was quiet in 1917, hence the output of construction materials was about the same as in 1916.

The yield of crude petroleum exceeded that for 1916 by 214,019 imperial gallons, this being the second year since 1907 that has shown an increase over the one previous. The output from the older parts of the oil region in Lambton county and neighborhood continued slowly to decline; but the falling-off was more than offset by the production from the new field in the township of Mosa, Middlesex county. Oil was struck there in the Corniferous limestone by Mr. J. F. Carman of Petrolia about 1st February. Some 40 producing wells have been drilled, and 13 dry holes. Oil is obtained at a depth of 300 to 375 feet, and the production up to the end of the year was 21,000 barrels. The oil has a gravity of 33 degrees, and is piped or hauled in tank wagons to North Glencoe. The pool so far as defined is on lots 5 to 8 in the fifth, sixth, and seventh concessions.

The output of the natural gas wells was the highest yet recorded. The large well struck in the Trenton, Dover township, has not maintained its original flow, and is now yielding considerable oil. Owing to widespread distress caused by the partial failure of the gas supply during the present winter, the Legislature has placed the entire natural gas industry under the control of the Ontario Railway and Municipal Board.

Miscellaneous.

Four gold mining companies paid out in dividends \$1,699,542.45, and 13 silver mining companies \$5,886,945.94, a total of \$7,586,488.39, being a decrease of \$4,064,061.70 as compared with 1916. There was an increase in the dividends by silver mining companies, but a decided decrease in those by gold companies. The total dividend distributions by silver and gold companies combined up to the end of 1917 was \$82,663,283.

A deposit of euxenite, a rich radium mineral, was found near Maberley in a feldspar quarry in South Sherbrooke township. It does not, however, appear to be present in commercial quantity.

ENEMY GETS CAUCASUS MANGANESE.

By the surrender by Russia of the new area to Turkey, Germany is assured of all the manganese ore she will require during the period of the war and forever afterward, as adjacent to Batum are the largest known deposits of high-grade manganese ore in the world. Germany has been in such straits to obtain manganese that she is now utilizing ore that contains as little as five per cent. manganese, at a prohibitive cost probably. Large quantities are required in war ordnance. Batum and Poti are the export ports of all this ore from the Black Sea. Germany has now secured control of a district that produced about one-third of the world's manganese ore in 1913.

Mineral Production of Quebec, 1917

By Theo. C. Denis.
Superintendent of Mines, Quebec.

The total value of the mineral production of the Province of Quebec during 1917, as shown by the provisional compilation of returns received at the Department of Colonization, Mines and Fisheries, amounted to \$16,051,188. This is an increase of \$2,764,164 as compared with the previous year, or 20.8 per cent.

In the table given below the "building materials" have been kept separate from the "products of the mines." As in the three previous years, the building materials show a decrease, whereas the products of the mine show an increase of 33 per cent.

The mineral production of the province of Quebec for 1917 (Figures for 1917 are subject to revision)

SUBSTANCE		Production 1917		
		Quantity	Value	Value in 1916
Asbestos.....	Tons.....	137,242	\$7,198,558	\$5,182,905
Asbestic.....	".....	17,210	42,139	28,252
Chromite.....	".....	35,726	495,981	312,901
Copper and Sulphur ore.....	".....	122,822	1,205,242	1,259,064
Feldspar and kaolin.....	".....	2,028	19,969	38,260
Glass sand.....	".....	.....	.....	24,140
Gold.....	Oz.....	1,116	22,570	13,041
Graphite.....	Lb.....	1,078,000	99,024	75,776
Iron Ore.....	Tons.....	11,593	31,365	.....
Magnesite.....	".....	58,090	728,275	525,966
Mica.....	Lb.....	961,237	282,153	177,814
Mineral waters.....	Gals.....	39,318	6,541	18,574
Mineral Paint (ochre).....	Tons.....	9,252	69,536	62,875
Molybdenite.....	Lb.....	207,286	158,096	129,267
Phosphate, Titaniferous iron ore, Quartz.....	Tons.....	7,547	30,995	14,242
Silver.....	Oz.....	96,620	78,880	38,113
Zinc and Lead ores.....	Tons.....	4,618	242,778	107,348
Structural Materials				
Brick.....	M.....	55,699	503,688	762,689
Cement.....	Bbls.....	2,079,404	3,264,664	2,525,841
Granite.....	".....	.....	137,159	292,270
Lime.....	Bush.....	1,274,868	280,527	276,245
Limestone and Marble.....	".....	.....	739,228	978,945
Sand.....	".....	.....	131,465	168,891
Sandstone.....	Tons.....	.....	7,475	8,190
Slate and Flagstone.....	Square.....	1,422	7,885	6,223
Tile drain and sewer pipe, pottery, etc.....	".....	.....	266,995	259,192
			16,051,188	13,287,024

Steady Increase in Value of Output.

The following table gives the total figures of the province for each year since 1900. It may be seen that in eighteen years the value of the mineral production of the province has grown from 2½ million dollars to 16 million dollars, a proportional increase of 540 per cent.

Year	Value	Year	Value
1900.....	\$2,546,076	1909.....	\$5,552,062
1901.....	2,997,731	1910.....	7,323,281
1902.....	2,985,463	1911.....	8,679,786
1903.....	2,772,762	1912.....	11,187,110
1904.....	3,023,568	1913.....	13,119,811
1905.....	3,750,300	1914.....	11,732,783
1906.....	5,019,932	1915.....	11,465,873
1907.....	5,391,368	1916.....	13,287,024
1908.....	5,458,998	1917.....	16,051,188

Asbestos.

Both in value and in tonnage the production of asbestos reached record figures in 1917. The demand was very keen, but, as in the previous year, the shortage of labor was felt. As compared with 1916 the proportional increase in tonnage was 3.0 per cent., and in value 38.9 per cent. The average price per ton rose to \$52.45. In 1916, this was \$38.87; for the previous years the figures were \$31.33 in 1915; \$26.96 in 1914 and \$28.04 in 1913.

The total quantity of asbestos-bearing rock mined and hoisted was 2,634,410 tons. The value of the asbestos extracted from it, counting stocks on hand at the end of the year, was \$8,120,409. This represents a value of \$3.08 of asbestos extracted from each ton of rock. In 1916, 1915 and 1914, these values were \$2.13, \$1.46 and \$1.44 respectively.

Copper and Sulphur Ore.

The shortage of mine labor and transportation difficulties seriously interfered with the production of copper and sulphur ore in the Eastern Townships. The ore is a copper-bearing iron pyrites, which is used for the manufacture of sulphuric acid, the resulting cinders being sent to copper smelters.

In 1917, the quantity of copper-sulphur ore extracted from Quebec mines was 122,822 tons, valued at \$1,205,242. This is a decrease, both in tonnage and value as compared with 1916, and much below what was expected, considering the keen demand for pyrite.

Zinc and Lead Ore.

The production of zinc and lead ores of the Province of Quebec amounted to 4,618 tons, valued at \$242,778.

PRODUCTION OF ASBESTOS IN THE PROVINCE OF QUEBEC FOR 1917.

Shipments and Sales			Stock on hand Dec. 31st, 1917		
Designation of Grade	Tons	Value	Average Value per Ton	Tons	Value
Crude No. 1.....	1,761	\$1,370,740	\$778.38	580	\$470,923
Crude No. 2.....	3,603	1,374,387	381.46	746	269,766
Mill Stock No. 1.....	13,197	1,318,387	99.90	1,089	206,124
Mill Stock No. 2.....	54,072	1,988,197	36.77	3,346	141,344
Mill Stock No. 3.....	64,609	1,146,847	17.75	7,447	124,735
Total.....	137,242	7,198,558	52.45	13,208	1,212,892
Asbestic.....	17,210	42,139	2.45	262	805
Total.....	154,452	7,240,697	.....	13,471	1,213,697

The whole production comes from the mines of Montauban township, in the county of Portneuf, but a great deal of development work was effected on the blende-galena deposits of Gaspé, at the head of the Cascapédia river. It is likely that shipments from these deposits will begin in the course of 1918.

Chromite.

The total production of chromite in 1917 shows record figures. From the Coleraine-Black Lake district, and from the new deposit worked in the Danville district, 35,726 tons were shipped, representing a total value of \$495,981. In 1916, the figures were 27,952 tons valued at \$312,901.

Molybdenite.

The Province of Quebec possesses the largest individual producing mine of molybdenite in the world in the Moss mine, in Onslow township, operated by the Dominion Molybdenite Company. This company has a large concentrator, of a capacity of 150 tons of rock a day, using the Callow process for the separation. During 1917, extensive diamond drilling operations were carried on, which blocked out large reserves of ore.

Magnesite.

The shipments of magnesite, crude, calcined and dead burned, reached 58,090 tons, representing a value of \$728,275. As compared with 1916 this is a proportional increase in value of 38.5 per cent. This increase is to some extent due to the fact that two producing companies are now making dead-burned magnesite. For this purpose, these companies are using the kilns of cement works in Montreal and in Hull, which were not operating on the manufacture of cement during the year.

6,311 Men Employed in Quebec Mines.

During the calendar year 1917, the number of men employed in the mines, quarries and concentrating mills was 6,311 as compared to 6,601 for the preceding year. These figures are on the basis of 300 days work. The work in the mines has been unusually active, notwithstanding the very rainy weather. Although a large number of men new to conditions of the mines have found employment, the total number of accidents has been much less than last year. The number of fatalities is notably less than that of the twelve preceding months, being 4 against 18. The total number of accidents reported to the Bureau of Mines during 1917 was 172.

The proportion of fatalities per 1,000 year men of 300 days work is 0.6. Only accidents resulting in a loss of time of more than 10 days are reported to the Bureau of Mines.

RUSSIAN AND ROUMANIAN OIL FIELDS.

Petroleum men, discussing the benefits to accrue to Germany from possession of the Russian and Roumanian oil fields, agree that despite the difficulties of transportation and the high cost of working the fields, Germany has been placed in a much better position to continue the war. Trustworthy reports indicate that Germany's weakest spot had been in the military transport system, which the reports said was threatened with complete collapse owing to lack of oil for motor trains. With new supplies available, Germany would be quick to replenish stocks whatever the cost. None of the oil men was inclined to minimize the gain to Germany of access to Russia and Roumania.

CANADIAN PLACER DEPOSITS*

In the discussion of a paper by Dr. Mellor on the conglomerates of the Witwatersrand, Mr. J. B. Tyrrell made the following remarks with reference to some of the placer deposits of Western Canada:

I wish to join in thanking Dr. Mellor for his splendid presentation of the characteristics of the conglomerates of the Witwatersrand, with the gold which they contain, and for his most interesting discussion of the methods which Nature may have adopted in forming these beds of conglomerates, and in placing gold in them.

The occurrence of a conformable sedimentary series five miles in thickness, like that of the Witwatersrand, is not in itself a matter for very particular comment, for such series occur in other parts of the world, especially along the flanks of important mountain ranges, and the coarseness or fineness of the sediments in them depends largely on the strength of the currents, whether caused by winds, tides, or rivers, by which the sediments were distributed. If small particles of gold, as well as pebbles of quartzite or other similar rock, were being supplied to the moving waters at the same time, they would be distributed together, but large particles or nuggets of gold would not be carried by water and dropped along with small or medium-sized pebbles of quartzite, etc., for the currents that would easily carry the latter would not move the former.

Gold in Edmonton Sandstones.

In Western Alberta, in a great series of conformable Mesozoic and Tertiary sediments, gold occurs in a finely divided state in the Edmonton sandstones at top of the Cretaceous. These beds were laid down near an old shore line, and the fossils contained in them prove that they were deposited in brackish water. No beds holding a sufficient quantity of gold to pay for mining have yet been discovered in these sandstones, but the streams which now drain the country east of the Rocky Mountains cut down into them in many places, and concentrate the gold derived from their sandstone banks into the gravel bars in the rivers, whence it is collected by simple methods of alluvial washing. The gold so obtained is in very minute particles which, under the microscope, may be seen to be well rounded like most other particles of placer gold. I believe that it is also in the form of such minute rounded particles in the Edmonton sandstones, from which it is derived, for no matter how near the gravel bars which now contain it may be to its probable source in the sandstone itself, the gold always presents the same rounded appearance.

Whether the gold is confined to certain definite strata in the series or not I do not know, but I have definitely determined its presence in, or in the immediate vicinity of, some of the beds of lignite which are interstratified with the sandstone.

In this particular instance the source of the gold is reasonably certain, for it was undoubtedly transported from the granite mountain range away to the west within the confines of the province of British Columbia, and was carried 200 miles or more before it finally settled near the shore of the brackish sea. Though nowhere concentrated into rich pockets or beds the total quantity so carried from the mountains must have been large.

In a disseminated placer, in which the gold has been distributed by tidal currents over a sea floor, no "pay-streak" such as is commonly found in stream placers.

would be looked for; but if actual beaches should be discovered, paystreaks might reasonably be expected to occur, for the gold would have been concentrated in them by the waves. In this connection the distribution of the conglomerates in the Far East Rand, described by Dr. Mellor in his paper, and illustrated by him in Fig. 48, strongly suggests the presence of such beaches formed on a gently sloping shore which was at the same time slowly and regularly sinking beneath the sea. Such a method of formation would account perfectly for the local parallelism of these bands of conglomerate.

Stream Placers of the Klondike District.

Stream and ocean placers have some common characteristics, and it may be interesting to refer to one or two of these. In the Klondike District, where I was mining placers for a number of years, the gold-bearing gravels occur in the bottoms, or what were once the bottoms, of river valleys. They are essentially of two ages, namely, Older Pliocene gravels and Newer Recent gravels. The former occur in the bottoms of wide, mature valleys, with gently sloping sides on which the underlying rock has decayed to such an extent that naked cliffs and escarpments are unknown; while the latter are in the bottoms of narrow, immature, and often gorge-like valleys cut in the bottoms of the old Pliocene valleys. These newer valleys are thus cut down through the older gravels, sometimes one or two hundred feet into the underlying hard granitoid gneiss or schist, and what remains of the older gravels may lie along the top of the steep banks of the newer valleys. In both these gravel deposits, wherever gold is present, it is concentrated in a thin, but ill-defined, layer just above bedrock and in the fissures of the underlying bedrock. The total average thickness of the gold-bearing layer might be put at 3 ft., 1 ft. of this being gravel and 2 ft. bedrock, though this thickness varies greatly in different places. In some parts of Dominion Creek the "pay," though very rich, was confined to a few inches of gravel just above bedrock, and the underlying bedrock was barren; while on a mining claim on Hunker Creek, which yielded a large quantity of gold, there was scarcely any gold in the gravel or in the upper foot of bedrock, for it had sunk as much as 7 or 8 ft. into the cracks of this bedrock.

The Newer Recent Gravel.

In the Newer Recent gravel the gold-bearing layer lies below the water level of the stream in the valley of which it occurs, and associated with the gold there is usually an abundance of "black sand," composed chiefly of small grains of magnetite and ilmenite, with some hematite and a little impure cassiterite or tin-stone, all more or less thoroughly rounded. This black sand lies loose in the gravel or in the cracks of the bedrock, being distributed much in the same way as the gold. On some mining claims crystals of pyrites were collected in considerable quantity with the gold in the sluice boxes. The crystals were always beautifully sharp and angular; I do not remember to have seen any that were rounded or waterworn. On closer investigation these crystals were invariably found to have been broken out of the underlying bedrock, and not to have been derived from the gravel. One claim which I was operating on Hunker Creek yielded large quantities of these crystals from a bedrock of dark graphitic schist.

The gold itself, both in the gravel and in bedrock, was always in more or less rounded and waterworn

nuggets and particles, known collectively as "dust." Even where originally in elongated or thread-like forms, these particles had been pounded and bruised, so that their points and angles had been rounded off. No new crystals or crystalline films of gold had been formed anywhere since this Recent gravel had assumed its present position.

With regard to the older Pliocene gravels, wherever they were well situated for examination, as on the tops of the banks of the newer valleys, they were found to contain neither magnetite nor pyrites. If either of these minerals had ever been present they had been leached out.

Recrystallization of Gold in the Older Pliocene Gravels.

In these older gravels most of the contained gold was in the form of well-rounded particles similar to those in the newer gravels. But in addition to such rounded particles or grains there were many pieces which showed beautiful sharp crystalline structure, either in moderately stout forms, or in delicate feathery shapes such as it would be difficult or almost impossible to move without crushing or destroying. In many cases this gold was in the form of thin crystalline films, between layers of the schistose bedrock, while, in one instance, Mr. McConnell, now Deputy Minister of Mines of Canada, drew my attention to a very delicate film of gold adhering to the outside of a pebble in the gravel.

Such crystals had never been mechanically transported along with sand and gravel by water, but had evidently been formed just where they were found. The gold would seem to have been first dissolved, probably by the action of water on the surrounding "dust," and then to have been precipitated from the solution, but in no instance did I find any evidence that pyrites took any part in this action, or was precipitated with the gold. Possibly the gold had not been carried any appreciable distance in solution, for the beautiful, fragile crystals above referred to were always found within the narrow limits of the original thin gold-bearing layer of gravel and bedrock, and not in the gravel above it or in the bedrock below it.

If the process of solution and precipitation which gave rise to these crystals were carried far enough it is quite conceivable that it might completely destroy the rounded character of the particles of gold usually found in placer deposits, and give rise to forms and characteristics similar to those found in the conglomerates of the Witwatersrand.

In the final summing up of the discussion, Dr. Mellor made these comments on Mr. Tyrrell's remarks:

"It is interesting to see that Mr. Tyrrell, whose experience with placer deposits is so extensive, finds no difficulty in accepting the gold of the Edmonton sandstones as alluvial, although it is so finely divided and so far from its source; and he also thinks it reasonable that large particles or nuggets of gold should hardly be expected in a deposit of medium-sized pebbles. Both these features in the Rand conglomerates appear to have given difficulty to those who limit their comparison to river gravels and similar alluvial deposits.

"Mr. Tyrrell's example of the solution and recrystallization of gold in Pliocene gravels is particularly interesting, especially as recrystallization seems to have taken place without any extraordinary conditions of temperature or pressure on the action of any particular solvent, such as are frequently demanded by those who find difficulty in accepting the recrystallization of the Rand gold."

Magmatic Ore Deposits, Sudbury, Ontario

By Alan M. Bateman.

The following is an abstract of a more extended paper published in *Econ. Geol.* Vol. 12, p. 391, 1917. Some articles relating to the Sudbury deposits have appeared since this paper originally went to press, and unfortunately are not included in it. They are: "Geology of the Sudbury Area," Royal Ont. Nickel Commission, 1917; "Magmas and Sulphide Ores," by Coleman, A.P., *Econ. Geol.*, Vol. 12, p. 427, 1917; "Quantitative Measurements of Minerals of the Nickel Eruptive at Sudbury," by Dresser, M.A., *Econ. Geol.*, Vol. 12, p. 563, 1917.

No other types of deposit have perhaps excited more scientific interest than those for which a syngenetic magmatic origin has been claimed. This is especially true for deposits of sulphides supposed to be of magmatic origin. Geologists have had little difficulty in accepting a magmatic origin for deposits in which the ore minerals are also common rock-forming minerals, such as magnetite deposits. On the other hand, there has been hesitancy in accepting a like origin for deposits in which the ore minerals are not common accessory minerals of rocks, such as sulphides. For this reason the Sudbury deposits have attracted more than usual interest—an interest increased by the fact that these ore bodies constitute the greatest nickel deposits in the world and because both a magmatic and hydrothermal origin have been claimed for them.

In his investigation of the literature of the subject the writer encountered certain conclusions supported by convincing evidence, and also opposing conclusions supported by equally convincing evidence, suggesting that a more correct conclusion would be one which includes some of the evidence presented by each side. Such a conclusion has been presented by one investigator.* A modification of this conclusion is presented by the writer, and it is believed that it is supported by convincing evidence on both sides and meets some of the objections advanced by different investigators.

Field Relations.

Rock Formations—The Sudbury nickel-copper deposits are intimately associated with a norite-micropegmatite intrusion, called by Coleman† the "Nickel Eruptive." It is in the form of a great spoon 36 miles in length and 15 miles in width. The centre of the spoon is filled by 9,000 ft. of sediments of Upper Huronian Age and rests upon a great thickness of crystalline and sedimentary pre-Cambrian rocks. All supposedly older than the nickel eruptive. Knight‡ has recently shown that a part of the granite footwall of the norite on the south side of the spoon is not older than the norite but intrusive into it. The latest phase of igneous activity is represented by numerous large diabase dikes which cut the norite and ore and are themselves cut by small granite dikes.¶

Ore Deposits—The Sudbury district is the source of the world's greatest nickel supply and is also an important producer of copper. Platinum and small amounts of silver, gold, and palladium are won from the ores, and iridium and osmium have also been noted. The present ore reserves indicate a supply for many years to come, and development and exploratory work are continually exposing more orebodies. Geologic conditions indicate that future work will add greatly to the present reserves so that a long life may be expected for the district.

Coleman* distinguishes two main varieties of ore-

*Ernest Howe, "Petrographical Notes on the Sudbury District," *Econ. Geol.*, Vol. XI, p. 503, 1914.

†Coleman, A. P., The Sudbury Laccolithic Sheet, *Jour. Geol.*, Vol. 15, p. 252, 1907.

‡Knight, Origin of the Sudbury Nickel Deposits, *Eng. & Min. Jr.*, Vol. 101, p. 811, 1916.

§Coleman, A. P., The Nickel Industry, Can. Dept. of Mines, Mines Branch No. 179, p. 11, 1913.

bodies, "marginal" and "offset" which he summarizes as follows:

Marginal (a) dipping toward the axis of the basin, ores with comparatively little rock and more than twice as much nickel as copper. (b) Faulted marginal—irregular in shape and character—usually mixed with much rock and carrying as much copper as nickel, or sometimes more.

Offsets: (a) Columnar offsets, roughly cylindrical bodies nearly vertical and going to great depth. Ore usually rich in copper and the precious metals. (b) Parallel offsets—not columnar, but sheet-like, dipping inward toward the basic edge. Ore like that of the usual marginal deposits.

Of these, the marginal deposits are the most important. They occur at the basic margin of the norite so that the norite forms the hanging wall and the adjoining country rock the footwall. Coleman states that orebodies may have a distinct foot-wall or may penetrate it along fissures and enclose blocks of it. He considers the hanging wall to merge gradually into a blending of rock and ore called pyrrhotite-norite, and then into pure norite with blebs of ore. Howe's‡ description of the Creighton differs from that of Coleman in that he considers the change from ore to norite to be less gradual and the "graduation to be due to a mechanical mixture of sulphides and norite in the transition zone, and not to a graduation in a mineralogical sense."

The offset deposits§ are like masses of ore and rock that extend outward from the main norite mass into the underlying older rocks, or more or less separate bodies having no visible connection with the main norite body. The columnar offsets as at Copper Cliff and Victoria mines are pipe-like bodies, somewhat resembling the Kimberley diamond pipes, from 50 ft. to 200 ft. in diameter.

Of the minerals that compose the Sudbury ores pyrrhotite, chalcopyrite, and pentlandite are the most important. Of these pyrrhotite is abundant, chalcopyrite is common, and pentlandite is common but is rarely seen with the naked eye. Less commonly pyrite, galena, and zincblende occur associated with quartz and carbonate and are usually in veins which, according to Coleman|| are later than the main ore bodies.

Previous Views of the Origin of the Sudbury Ores.

The scientific interest attached to the celebrated Sudbury deposits is due not only to their unique character but to the problem of origin they present. The previous investigators may be divided broadly into two schools; those favoring an origin by means of hydrothermal agencies, and those by magmatic differentiation. Some modifications of both hypotheses have been advanced.

The earlier views have been so excellently summarized by A. E. Barlow|| that it is necessary only to refer to them without further discussion. Barlow states that the first investigators, Collins, Merritt, and Bell, ascribed a hydrothermal origin to these deposits; the same origin was adopted later by Emmons, Bush, Argall, and others.

The first to advocate an igneous origin for the Sudbury deposits was Barlow. Somewhat later Vogt advanced a similar origin to explain the Norwegian deposits. Since that time Barlow's views have been advocated by Adams, Browne, Kemp, Walker, and

*Coleman, A. P., The Nickel Industry, Mines Branch, No. 170, 1913, from which the descriptions here given are drawn.

†Idem, p. 34.

‡Howe, Ernest, *Econ. Geol.*, Vol. 9, p. 514, 1914.

§Op. cit. 35.

||Op. cit., p. 27.

others. In later years Coleman has carried on extensive work in the Sudbury district and is perhaps the strongest advocate of the views of Barlow. After Barlow's explanation appeared there was no dissenting opinion until C. W. Dickson* concluded that the sulphides were deposited from solution. A similar study led Beck† to the same conclusion. Later Campbell and Knight‡ investigated the problem by a metallographic study and supported Dickson's views.

In 1911 Ernest Howe and J. D. Irving visited the Sudbury region and Howe§ advocated a modified igneous origin for the Sudbury deposits by which differentiation took place in the magmatic reservoir and the sulphides were intruded as such, in a molten state. In 1916 a preliminary article appeared by C. W. Knight|| in which he shows that the age relations of some of the intrusive rocks are different from what had hitherto been considered, and he concludes the ores are of hydrothermal origin. The latest publication dealing with the Sudbury deposits is that by Tolman and Rogers|| in which the ores are believed to have been formed by replacement of the norite by the action of "mineralizers."

Discussion of Recent Views.

Magmatic Segregation—Coleman's summary of the arguments in favor of magmatic segregation are:**

1. Universal association of ore and norite of a single eruptive sheet.
2. Intimate admixture of ore and norite and gradation from norite with scattered particles of ore, to pyrrhotite-norite with equal amounts of each, to almost pure ore with few rock minerals.
3. The adjoining footwall rocks are not spotted by ore nor do they surround separated bodies of ore; they are penetrated by veinlets of ore and included as blocks within the ore. This feature is due to shattering at the time of the norite intrusion and the heavier and probably more fluid sulphides filled all the spaces thus opened. Clean walls of country rock abut against large bodies of pure ore.
4. The freshest norite is generally close to orebodies and often spotted with ore. No considerable rearrangement caused by water could have taken place without altering so susceptible a mineral as hypersthene.
5. Absence of hydrothermal or pneumatolitic action in marginal orebodies; no banded cavity fillings or concentric structures typical of hydrothermal deposition. Scarcity of usual hydrothermal minerals.
6. Uniformity of deposits, regardless of the nature of the foot-wall rocks, throughout the entire norite margin indicates a single source, the norite.
7. Largest orebodies occur where bays of norite project into the country rock or on offsets from such funnel like bays; paucity of deposits along a straight margin. This is intelligible if the ore settles into the hollows underneath the molten sheet, but not so if formed from solutions.

Coleman's first argument of invariable association of ore and norite favors magmatic segregation. This same association holds true throughout the world, and there is no conclusive evidence against sulphides forming a part of an igneous rock and passing through a

molten condition. Magmatic sulphides have been noted in many rocks from many localities.

Coleman's second argument is one of the strongest advanced by the advocates of a magmatic segregation, and if true is one of the strongest points in favor of magmatic segregation as opposed to a hydrothermal origin. Howe*, however, has shown that in the Creighton mine this is a mechanical fading out and not a petrographic one as contended by Coleman. Specimens examined by the writer support a part of Coleman's contentions and indicate that while the main bodies fade out mechanically, beyond them there is a pyrrhotite norite in which the pyrrhotite gives every appearance of being an original constituent. Knight† states that the footwall rocks are also spotted with sulphides in a manner similar to the pyrrhotite norite. The statements by Howe and Knight invalidate to considerable extent the strength of the argument of fading out as a proof of magmatic segregation, and investigation indicates that while most of the transition is a mechanical one, there is also a small amount of petrographic transition.

The first part of Coleman's third argument is directly contradicted by Knight‡ who states that granite, greenstone, and graywacke are also spotted by ore, and that some of the orebodies are actually impregnations of the footwall rocks. A latter part of Coleman's third argument is given as an explanation for the ore in veinlets in the footwall rocks but is opposed to magmatic segregation for such spaces, which he states were formed by the intrusion, would have been filled by undifferentiated magma, and probably chilled, long before differentiation would have proceeded far enough to allow of any segregation of molten sulphides at the bottom of the norite. There is no evidence of any undifferentiated magma at Sudbury.

Coleman§ similarly explains the offset deposits, but the same objections apply.

Coleman's fourth argument pertaining to the freshness of the hypersthene in the norite is strongly opposed to a hydrothermal origin for these deposits, and while suggestive of a magmatic segregation, it cannot be used exclusively for it. Many investigators have found that there is considerable alteration of the norite and that in the large orebodies it is greater adjacent to the ore. Many pages have been written minutely describing the nature of such alteration.

In the fifth argument, the scarcity of typically hydrothermal ore-forming minerals is a further indication that these deposits are not to be classed as entirely of hydrothermal origin, but neither is it proof of magmatic segregation. Also the lack of banding, concentric and preserved structures suggests an origin other than hydrothermal but can no more be used as an argument in favor of magmatic segregation, as is done by Coleman and others, than of contact metamorphic deposits.

Coleman's sixth argument is suggestive of an igneous origin. It is opposed to a hydrothermal origin, for it is difficult to understand how ores deposited from solutions with fluctuating conditions of composition, concentration, temperature, and pressure could be so uniform all around the norite intrusive. It is, however,

*The Ore Deposits of Sudbury, Ont., T.A.I.M.E., Vol. 34, pp. 1-65, 1903.

†Nature of Ore Deposits, p. 41, 1903.

‡Microstructure of Nickelliferous Pyrrhotites, Econ. Geol., Vol. 2, p. 350, 1907.

§Econ. Geol., Vol. IX, p. 503, 1914.

||Eng. & Min. Jour., Vol. 101, p. 811, 1916.

||Magmatic Sulphide Ores, Leland Stanford University Publications, 1916.

**Op. Cit., p. 18. Condensed from original.

*Howe, Ernest, Petrographic notes on the Sudbury Nickel Deposits, Econ. Geol., Vol. 9, p. 503, 1914.

†Eng. & Min. Jour., Vol. 101, p. 811, 1916.

‡Loc. City. The reader is also referred to Knight's latest contribution (not incorporated in the original of this paper) in which this point is thoroughly discussed.

§Can. Dept. of Mines, Mines Branch No. 170, p. 36, 1913.

||These points are discussed more fully in the original paper, pp. 408-410.

no stronger an argument for Coleman's magmatic theory.

Coleman's contention, in the seventh argument, that the settling of the molten sulphides into the hollows of the footwall under the molten sheet can be explained only by an hypothesis of magmatic segregation, is decidedly upset by Knight's evidence.* He states "Clearly then the molten sulphides could not have settled to the bottom of the norite magma for the very good reason that the granite was not there when the norite was erupted."

Probably the strongest argument in favor of a magmatic segregation is the marginal position of the ore-bodies with respect to the intrusive. It is difficult to explain this position by any other hypothesis.

The breccia of footwall rocks enclosed in ore and norite is construed by Coleman in favor of a magmatic segregation.† He considers it to have been formed by the molten sulphides and norite on the bottom of the intrusion tearing off and enclosing fragments of the footwall on its way to its present position.‡ This would assume the sulphides to have been already segregated on the bottom of the norite while the intrusion was reaching its present position, a condition impossible in view of the length of time that must elapse before differentiation could proceed far enough for sulphides to accumulate at the bottom. The breccia, in the view of the writer, is opposed to magmatic segregation, but is readily and simply explained by Howe's hypothesis.

While certain evidence suggests that a minor amount of magmatic segregation took place, it would appear that a great array of conclusions is opposed to it as an adequate explanation of the Sudbury ores. Some other hypothesis must then be sought.

Hydrothermal Origin.

Dickson§ found several features irreconcilable with a magmatic origin. He found evidence of solutions in (1) the replacement of rock forming minerals by sulphides, (2) by development of secondary hornblende, greater where ore replacement had been greater, (3) widespread brecciation and shearing with ore filling the shear planes and acting as a cement to the rock fragments, (4) angular shape of included rock fragments, and (5) abrupt changes from massive sulphides to barren rock. Dickson produces many arguments which oppose magmatic segregation but do not necessarily uphold the hydrothermal origin. In fact many of them support Howe's modified magmatic hypothesis equally well. He also produces evidence which indicates that hydrothermal solutions have been a factor in the formation of the ores.

Campbell and Knight|| think that the sulphides have replaced each other, traversed rock and silicates occur in definite order, thereby indicating hydrothermal origin.

Knight shows (1) that the sulphides could not have segregated upon the granite footwall for it was not there (2) that they mix with the older greenstone and graywacke and younger granite as they do with the norite. (3) The occurrence of hydrothermal minerals in the Worthington mine is emphasized. Since ore penetrates the granite and Knight shows that the granite cuts the norite, it is clear that the ore is both later than the granite and norite, and cannot, therefore, be a segregation from the norite.

*Loc. Cit., p. 811.

†Op. Cit., pp. 34-36.

‡Op. Cit., pp. 34, 36.

§Op. Cit.

||Microstructure of Nickeliferous Pyrrhotite, Econ. Geol., Vol.

The writer agrees with Knight in so far as he shows magmatic segregation to be untenable, but fails to find in his arguments positive evidence actually supporting a hydrothermal origin for all of the deposits. Because his structural relations deal a fatal blow to magmatic segregation, it does not necessarily follow that because a rival view is vanquished, the conclusion of a hydrothermal origin is the only alternative, for it supports Howe's modified theory as well.

The writer thinks that the advocates of a hydrothermal origin produce certain evidence to show that it has played some part in the ore formation, but that it does not conclusively prove that all of the deposits have been formed by this means. While a certain amount of hydrothermal rock alteration is present, the profound hydrothermal alteration found in most deposits of unquestioned hydrothermal origin, is absent from the Sudbury deposits, otherwise the norite would not be dark, but light in color.

Modified Magmatic Origin.

Howe* found that the intimate mixture of granite, greenstone and norite in the ore precludes a hydrothermal origin and that microscopic work indicates that the sulphides were introduced in a molten state. He proposed his modified magmatic hypothesis, which accounts for the ore as having been introduced in a molten condition through a differentiation in the magmatic reservoir, after the norite had cooled. Thus the deposits would be magmatic, though no segregations.

Knight's later finding, that at the Creighton mine the granite intrudes the norite, does not invalidate the principle of Howe's hypothesis, for his supposed intrusion of sulphides can just as well be regarded as having taken place after the granite intrusion.

As Howe's paper deals chiefly with petrographical notes he offers little discussion in support of his hypothesis; consequently there is no explanation as to how his hypothesis reconciles the marginal position of the orebodies. This theory, in the belief of the writer, accounts for the Sudbury conditions more accurately than any previously advanced.

Modified Hydrothermal Origin.

Tolman and Rogers† believe that the ores are magmatic, yet formed by means of "mineralizing solutions" or mineralizers. They state that the sulphides surround, cut across, and replace rock silicates, and they present microscopic evidence which they interpret to indicate that the sulphides were formed before the hydrothermal alteration of the rock silicates. They would thus place the period of mineralization after the consolidation of the norite, and before the hydrothermal solutions, which emanated as an after effect of the intrusion. They consider that the ores are not magmatic in the usual sense, because they are later than and replace the rock silicates, and that they were deposited by "mineralizing solutions"; but they do not consider them to be ordinary hydrothermal deposits because the formation of the sulphides is thought to precede the hydrothermal alteration of the rock silicates. They re-define "magmatic ores" to fit in with their interpretation, and assume a definition for hydrothermal not usually accredited, i.e., the ores must be accompanied by alteration of the rock minerals. In view of findings of other authors and the writer, the abundant evidence of replacement noted by Tolman and Rogers cannot be typical of all the Sudbury ores. Their age relation between the formation of the sulphides and the alter-

*Op. Cit.

†Tolman, C. F. and Rogers, A. F. Magmatic Sulphide Ore.

ation of the rock silicates upon which they base their new type is also seriously open to question.*

In view of the evidence shown by others it is incorrect to apply broadly the theory of replacement to explain all of the Sudbury ores. The writer is unable to see in what way the arguments of Tolman and Rogers present any but a hydrothermal origin for the Sudbury ores.

One point seems clear, and that is that the ores could not all have been formed by magmatic segregation, and that they were introduced later than the norite. The problem of origin, then, concerns itself chiefly with the agencies of transportation by which the ores were brought to their present place, whether hydrothermal or igneous intrusion of sulphides.

Suggest Modified Hypothesis for Origin of Sudbury Ores.

The above discussion indicates that the genesis of the Sudbury ores is complex and that there is much conflict of opinion both as to interpretation of data and observations. The opposing hypotheses set forth an array of arguments and facts that is persuasive when one hypothesis alone is considered. All of them present plausible and convincing points which are not explained or set aside by the opposing arguments and are worthy to stand in any consideration of origin of the Sudbury deposits.

It thus appears to the writer that an hypothesis which would embrace the convincing arguments of the opposing views, if in agreement with other observations, would be a correct one. Accordingly he presents a modified hypothesis, which follows Howe's and embraces and comprises some of the features of the others:

In a magmatic reservoir beneath the Sudbury region differentiation took place, but before completion a portion of it was extruded to form the "Nickel Eruptive." The extruded portion continued to differentiate in the upper chamber and gave rise to the micropegmatite-norite transition. The sulphides present became segregated to the bottom of the norite thereby accounting for the pyrrhotite norite and perhaps a minor part of the orebodies. In the meantime differentiation continued in the remainder of the magma below, and it may be considered to have divided itself into an acid and basic portion. A further intrusion then injected the acid portion between the already solidified norite and the greenstones, forming the granite described by Knight. Following this, the process as conceived by Howe may be considered to have taken place and an expulsion took place of a magma overloaded by sulphides, which, upon consolidation, formed the greater part of the orebodies. Still later expulsion gave rise to the dikes which cut the ore and previously intruded rocks. As an after effect of the igneous activity, magmatic waters, similar to those which emanate from most ore deposits, traversed the previously formed deposits, super-imposing upon them those hydrothermal effects described by Dickson, Knight, Tolman and Rogers, and others. The solutions then wandering farther from the norite contact formed those outlying deposits, such as the Worthington, whose hydrothermal characteristics are unquestioned. Thus there was completed a sequence of igneous activity of which the formation of the ore deposits was a part.

This modified hypothesis would explain the ores by magmatic segregation, magmatic differentiation in the magmatic reservoir, and hydrothermal action, but the

greater part of the larger orebodies would be accounted for by differentiation in the reservoir and intrusion as a heavily charged sulphide magma.

Relation of Proposed Hypothesis To Other Hypotheses.

The proposed hypothesis would account for the pyrrhotite norite and for the sulphide particles so widely distributed along the margin of the norite by the first phase of the mineralization. The main marginal deposits, as the Creighton, and the offset deposits, would be accounted for chiefly by the second phase of mineralization, or the intrusion of sulphides and some rock matter. Thus the objection raised by Coleman that* Howe's hypothesis does not explain the pyrrhotite norite, is met by the first phase of mineralization, while the second phase would account for the ore breccia with fragments of rock surrounded and penetrated by sulphides. This breccia cannot adequately be explained by the segregation hypothesis since the granite is later than the norite and the ore is later than the granite. The filling of all cracks and like openings by ore, so difficult to account for by segregation, is readily explained by the hypothesis proposed.

The observations of Dickson† are explained by Howe's part of the hypothesis, but not by the segregation theory. Dickson uses his points to uphold the hydrothermal theory, but the angularity of the fragments suggests inclusion by intrusion rather than nuclei of unreplaced rock. The abundant evidence presented by Dickson and others of sulphide veinlets seaming rock fragments and penetrating mineral cleavages would be expected from sulphide intrusion as well as from hydrothermal action, so that the proposed hypothesis combines those features advocated for the hydrothermal origin and antagonistic to the segregation theory.

The comparative freshness of the norite surrounding the ore is readily understood if the ore be an intrusion, but not if all the ore were formed by hydrothermal agencies, for, as Coleman points out, the susceptible hypersthene would surely succumb to alteration. While some hydrothermal alteration is present, notably in the offset deposits, it is nothing as compared to the extensive alteration accompanying ores of unquestionable hydrothermal origin. Another point that suggests igneous origin is the absence of the gangue minerals that usually accompany hydrothermal ores. With an igneous origin the only gangue to be expected is the accompanying rock, such as is found in the ores. The order of succession of sulphides is advanced in support of deposition from solutions, but the mineral succession in a granite does not imply solutions. Howe suggests that the order would seem to be better explained by the nearly simultaneous cooling of the different sulphides that had previously separated as distinct mineral compounds, non-miscible, though still molten." In this way the last to crystallize would penetrate the earlier sulphides.

Certain features, such as the alteration of the pyroxene and the occurrence of typically aqueous minerals are clearly indicative of hydrothermal origin and are to be attributed to the hydrothermal phase of mineralization in the proposed hypothesis. The writer believes that only a minor part of the orebodies has been contributed by solutions and that their work had been chiefly a slight alteration and contribution of ore with a certain amount of enrichment and rearrangement of some of the previously formed sulphides. It may be seen that hydrothermal mineralization of this nature

*See also more recent paper by M. A. Dresser, *Econ. Geol.*, Vol. 12, p. 562, 1917.

†*Econ. Geol.*, Vol. 10, p. 390, 1915.
†*Op. Cit.* p. 59.

super-imposed upon previously formed ores would confuse characteristics of the previous processes, and a study of those places most affected would give rise to the impression that all of the ores had been formed by hydrothermal agencies. The hydrothermal origin of the Sudbury ores has attained in the literature a position hardly justified, because observations antagonistic to the segregation theory have been applied as convincing arguments in support of a single working hypothesis when they are capable of more than one interpretation if applied to multiple working hypotheses.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

The policy of the Provincial Government in increasing taxation of the mineral industry is meeting with protest from some of its own friends as well as from most mining men. Recently the Victoria Daily Times, which is the leading newspaper supporter of the Government, printed an account of a debate in the Legislative Assembly in the course of which it reported a prominent supporter of the Government to have stated that "the mineral world is smarting under an injustice in the matter of its taxation. He quoted much statistical data, and pleaded the case of the concern mining low-grade ore. One operator would spend \$1,000,000 to take out \$1,250,000, while his neighbor would spend but \$500,000 with a similar result, and yet both were subjected to the same taxation method. The point he was anxious to drive in was that the mining world should be taxed on an entirely fresh basis. He would advocate a policy that would say to the capitalist who wished to mine in British Columbia, 'Come in and develop the minerals, and just so soon as you show that you are mining at a profit that will be the stage at which British Columbia will step in and ask you to pay a just due on account of that profit.'"

The Daily Colonist, the oldest morning newspaper published in British Columbia, has displeased some of those who have in recent months been busily engaged in advocating the establishment of an iron and steel industry in British Columbia. In the course of some timely editorial comment the Colonist observed: "When British Columbia's delegates go to Ottawa to place before the Government this Province's claim to assistance in establishing an iron and steel industry on the coast, probably they will be subjected to a series of questions which we hope they will be in a position to answer in a way which will be satisfactory to the Federal power. They will have to be able to say what capital is already available for the establishment of such a plant. Very naturally they will be asked about labor conditions in this Province, the wages that prevail, the supply of skilled workers for such an industry, and the permanence of the economic situation. A subject of conversation with the Government will also be the extent to which the Provincial authorities are prepared to aid the enterprise." This frank expression of opinion is not pleasing to some prominent members of the Victoria Rotary Club, which has taken the lead in the agitation of the last few months with the object of trying to induce the Federal Government to practically establish the desired industry, consequently the Colonist has come in for sharp criticism.

EAST KOOTENAY.

There has been a substantial increase in the quan-

tity of ore shipped to the smelting works at Trail from East Kootenay mines since the beginning of the current year. The total of ore receipts at Trail from this district for the month of January was 5,843 tons; for February it was 8,069 tons, and for the first week of March 2,289 tons, together 16,201 tons to March 7, inclusive. Of this total, 14,897 tons was from the Consolidated Mining and Smelting Co.'s Sullivan mine—14,765 tons of zinc ore and 132 tons of lead ore. While the same company's St. Eugene mine sent in 162 tons of lead ore. The Paradise mine, in Windermere mining division, shipped 1,078 tons of silver-lead ore, and three small mines the remaining 64 tons.

WEST KOOTENAY.

Ainsworth.—While the largest shipper from Ainsworth mining division so far this year has been the Consolidated Co.'s No. 1 mine, with an output of 1,337 tons of silver ore, several other mines have resumed production, among them the Bluebell with an output of 203 tons of lead ore, and the Florence which late in February shipped 209 tons from its concentrating mill. Of half a dozen other shippers, the largest individual total was that of the Montezuma, on South Fork of Kaslo Creek, which shipped 106 tons from an old dump, the mine not having been worked in recent years.

Slocan.—Slowly shipment of ore from Slocan mines to Trail is being resumed. Total of 1918 receipts to March 7 was 2,501 tons, of which 1,242 tons was from the Surprise, in the neighborhood of Sandon, and 889 tons of zinc ore from the Lucky Jim, in the eastern part of the division. Half a dozen or more of the smaller producers are also on the shipping list. The Standard has shipped zinc concentrate to the United States and has stored its lead product. The Galena Farm is preparing to make a considerable output this season. The several mines being worked by the Clarence Cunningham syndicate are in a position to produce silver-lead ore in quantity whenever conditions shall be less disadvantageous than of late. Development work is being continued on other properties, preparatory to production later.

Nelson.—The Emerald mine, near Salmo, in the southern part of Nelson division, has shipped to Trail about 200 tons of lead ore, and two or three small lots of ore from other properties in that part of the district have also been received there. The Consolidated Co.'s Molly Gibson mine, at the head of Kokanee creek, and the Beasley-Monarch, also on the north side of the Kootenay river, have both shipped ore this year. The total output of ore from mines in this division, though, is disappointingly small.

Rossland.—Rossland mines are maintaining a comparatively large output, their total to March 7 of ore received at Trail having been 40,266 tons, of which the Le Roi shipped 18,656 tons, the Centre Star group 17,866 tons, the Le Roi No. 2 Ltd.'s Josie group 2,803 tons, and the White Bear 941 tons.

Trail.—Ore receipts at the Consolidated Mining and Smelting Co.'s smeltery here during the week ended March 7 totalled 8,958 tons, this quantity bringing the total receipts for the year to that date up to 70,351 tons, of which 61,047 tons was ore from mines operated by the company and 9,304 tons was of custom ores.

BOUNDARY.

Little news of operations at the Boundary district mines and smelting works of the Canadian Copper Corporation and Granby Consolidated M. S. & P. Co., re-

spectively, is being made public; so that there is nothing to chronicle other than that both companies are continuing to work their mines and that ore-smelting is being continued at their smelting works.

The Consolidated Co. is maintaining a fairly large output of copper-gold ore from its Emma mine, situated in Summit camp, two miles from Eholt. This year's receipts at Trail to March 7 show a total of 6,697 tons.

Vancouver men have taken the Union mine, in Franklin camp, north of Grand Forks, under bond and option of purchase. Transportation conditions are at present unfavorable to any considerable output of ore being made from mining properties in that camp.

GENERAL NOTES.

A Vancouver mining company, known as the New Hazelton Gold Cobalt Co., is reported to have shipped to Vancouver for treatment there three tons of molybdenite ore.

A measure before the Provincial Legislature has for its object giving prospectors the right to locate mineral claims in Strathcona Park, an extensive area on Vancouver Island in which the location of such claims has heretofore been prohibited.

Representatives of the chief coal-mining companies of British Columbia recently waited on the Provincial Minister of Mines and urged upon him that a proposed act he is submitting for the consideration of the local legislature, to provide for a general 8-hour day for all mine employes, both above and below ground, will result in a decreased production of coal at a time when the cry is for increased output to offset the threatened shortage of coal east of the Great Lakes.

The cost of production of coal had increased since 1907 by \$1.10 per ton, Mr. Nicol Thompson, deputy fuel controller for British Columbia, stated. While production has increased 28 per cent., wages alone had advanced 35 per cent. The average cost of coal now was \$4.50 per ton at the mine.

That 52½ per cent. of the labor employed in and about the mines on Vancouver Island is Chinese was a statement made, operators having difficulty in getting white men in view of the great labor shortage.

The Minister of Mines said the Government was anxious to increase output, but, he stated, the eight-hour day is surely coming. The Dominion Government was expecting 2,500,000 tons more this year from the West to offset the shortage in the East. He promised to give the representations every consideration.

NORTHERN ONTARIO.

Hohenour.

Work on the Hohenour claim in the Kirkland Lake district has been suspended. This property is under option to the Temiskaming Mining company. Whether or not the option is to be given up has not been officially announced as yet, but the work has been completely suspended. The plant which has been used in working the Hohenour claims was that formerly in operation at the North Dome property of the Temiskaming.

High Grade Ore at Chambers-Ferland.

The recent strike of high grade ore at the Chambers-Ferland property of the Aladdin-Cobalt Mining company is growing in importance and already a considerable amount of high grade ore has been bagged from the new vein which has been drifted on for a distance of about thirty five feet. The high grade portion of the vein is about five inches in width and carries silver

values of as much as five thousand ounces to the ton in places. The discovery of the vein was made on the 280-ft. level.

Otisse and Davidson Claims Optioned.

Two large mining deals have been made in the Fort Matatchewan district recently. The Otisse claims have been taken under option by New York interests and, according to reports, the same interests have also acquired an option on the Davidson claims. The latter were the first group in this district on which gold in spectacular quantities was encountered, and their exploration will have a more or less vital bearing on the entire field.

Kirkland Lake Gold

The general opinion of those usually well informed in matters concerning the Kirkland Lake Gold Mines, Limited, are of the opinion that work on the property will be resumed in the near future. Provided arrangements are made for the resumption of operations early this spring, the mine should be in the list of producers by late summer. The concrete foundations for the mill were placed last fall and a good deal of the machinery has arrived at the property, so that it would be possible to commence work on the milling plant within a very short time. Already there is approximately \$1,000,000 in ore reserves blocked out. One of the first developments on the re-opening of the mine will be the sinking of the new central shaft to the lower workings, which have now reached a depth of seven hundred feet. This will centralize the work and facilitate the handling of the ore more efficiently than was possible through the smaller working shaft.

Elliot-Kirkland.

Commercial ore has not yet been encountered in the lower workings of the Elliot-Kirkland, although indications are good. The proving of ore at the 400-foot level of the Elliot-Kirkland property would be significant in that it points to the possibility of the auriferous zone continuing further west than was heretofore expected. The developments on this property have also a vital bearing on the Kirkland Lake Gold, proving almost conclusively that the ore-bodies of the latter continue consistently across the property. Indeed, the persistency of the main fracture lends still further to the belief of not a few mining men that ore may be expected to continue to much greater length than as yet proven in the Kirkland Lake area.

Hollinger.

As the work of tuning up the new milling equipment at the Hollinger is progressing and working forces at the big mine increase, it is not unreasonable to expect more rapid increase in the production from this mine in the near future. So far the new milling equipment has proven highly satisfactory in every detail.

O'Donald Property Optioned.

The O'Donald property at Boston Creek has been optioned to large Detroit mining and manufacturing interests for a sum of \$250,000. This property consists of 200 acres situated between the Boston Creek Mining Company's property and that of the Patricia Syndicate and a number of veins have been encountered on the surface. Before the deal was closed sixty days' examination of the property was made by representatives of the company purchasing the property. Development work is to commence immediately and a substantial sum will be spent monthly. A portion of the claims are located in Boston Township, while the

balance runs into the township of Pecaud, and it is anticipated that some of the veins of the Patricia Syndicate and Boston Creek Mines will be picked up in the O'Donald group.

Developing Walsh Claims.

The Crown Reserve Mining Company of Cobalt is making good time in the work of developing the Walsh claims at Gowganda, on which the Crown Reserve has an option. The shaft has reached a depth of one hundred feet and a station is being cut preparatory to the commencement of lateral work.

Trethewey Orders Groch Machines.

Three Groch oil flotation machines are to be installed at the Trethewey mill, the order having been placed for the equipment this week. During recent months the installation of tube mills and other equipment has been going on and the flotation machines will be the final addition. It is anticipated that delivery will have been made by the first of May and the entire new installation will be pressed into service immediately. The new plant is designed to treat about one hundred and fifty tons per day. The impounded tailings on the Trethewey amount to 66,000 tons and the silver content runs between four and five ounces to the ton, thus it is anticipated that about 300,000 ounces will be recovered. From the treatment of this huge dump not far short of \$70,000 net profit is expected to result, although the president of the Trethewey Mining Company has estimated these profits at anywhere from \$30,000 to \$70,000.

Installing Plant at Peterson Lake.

The preparatory work for the installation of the oil flotation plant on the Peterson Lake property is under way. Excavation for the foundations and the laying of same have been commenced. Slightly used machinery has been purchased and is now being transported to the property. It is the aim of the management to have the equipment installed and in operation by June, when the work of treating the tailings from the Seneca Superior ore will be carried out.

Lake Shore Mill in Operation.

The new mill at the Lake Shore Mine at Kirkland Lake is now running on the first month's production. While awaiting the arrival of delayed portions of the equipment other portions of the plant were tuned up, so no time was lost in placing the plant in operation once the delayed portions arrived. So far everything has been found to run smoothly. The mill for the present will be treating about sixty tons per day, but provision has been made for adding to the equipment at short notice so as to almost double this capacity. A large tonnage of ore is already broken down, and the underground developments are well in advance of requirements for the present milling facilities.

Discoveries in Eby Township.

Eby Township, which corners on Teck, would appear to be in line for considerable attention this coming summer. Late last fall a discovery of gold was reported on the Adair-Sturgeon claims, since which time development work has been carried on with satisfactory results. Considerable stripping has been done on the veins and a test pit has been put down a depth of about ten feet. Channel assays taken across a satisfactory stoping width are said to assay \$3.50 per ton in gold and around eighteen ounces of silver to the ton.

McKinley-Darragh.

It is expected the annual report of the McKinley-Darragh Mining Company will be out next month. The company started the year 1917 with a cash surplus of \$264,942. It was at that time intimated by an official of the company that the satisfactory conditions at the mine tended to indicate that the year would end with the company in still further improved conditions. While the liquid assets of the company are expected to show a decline, the new flotation equipment which will be in operation on the old tailings dump will offset to a considerable degree the lower estimates of ore. The total production of silver for the year 1917 will show about 1,000,000 ounces. As silver averaged about 82 cents per ounce, which would place a value of approximately eight hundred thousand dollars. Development work at the mine is going on as usual and the physical condition of the property is far from weak.

Adanac.

Recent developments at the Adanac mine have been of a highly encouraging nature. Heretofore everything was favorable to the deposition of silver in commercial qualities, with the exception of there being insufficient shearing of the formations. At a number of points, the formation gave evidence of disturbance, in which cases silver sometimes occurred in considerable quantities and permitted of the bagging of some high-grade ore. For some time past, under the advice of Mr. Alfred R. Whitman, the eminent geologist, drifting operations have been carried towards the portion of the property a little south from the Temiskaming boundary. Conditions met with have proved almost identical with the forecast of Mr. Whitman, and the shearing now in evidence is very pronounced. According to mining men in the camp, the encountering of commercial ore in substantial quantities is not unreasonable to expect. Recently, the capitalization of the company was increased by 500,000 shares, 228,000 shares of this increased issue have been disposed of at 10 cents per share, which will afford sufficient funds for the completion of the development programme outlined by the management, and will finance the company for the balance of the year 1918.

McIntyre.

Developments at the McIntyre mine are stated to be the most favorable in the history of the mine. Making profits of close to twenty-five per cent. on the \$3,600,000 issued capital and carrying on the most extensive development campaign in its time, it is an agreeable revelation to learn that development work had reached its highest degree of importance. Before long, the main drive through the McIntyre-Extension to the Jupiter will be completed, and all these workings will be connected up at the 1,000-foot level. A miniature electric railway will be run along this drift at a depth of 1,000 feet, and regulation mine cars will be loaded from the workings above this level, as the 1,000-foot level is the main haulage way of the mine, and the ore from the upper levels finds its way through the various chutes to the cars waiting to receive their load. As far as possible, the mechanical equipment will replace manual labor in all branches of the work with an appreciable lowering of operating costs. The milling equipment at present has a capacity of about 600 tons per day. It has, however, been intimated that, at no distant future, the equipment will be increased to 1,000 tons per day. With facilities for handling 1,000 tons per day, the output of the mine would approximate \$10,000 per day, as the grade of ore being handled is

running slightly above \$10 to the ton. This production would total \$3,650,000 per year or amount to 107 per cent. on the issued capital of the company. Net profits at this mine have been running about fifty per cent. of the gross production. Thus the announcement of a further increase in the milling capacity of the mine will be reason for much satisfaction to the shareholders.

Boston Creek.

The number one shaft of the Patricia property at Boston Creek has reached a depth of over 150 feet. At the 100-foot level, upwards of 200 feet of lateral work has been done. The shear zone in which the vein occurs is wide, however, the pay streak has a width of approximately forty inches. The number two shaft has reached a depth of 100 feet and lateral work at this point is also in progress. Excavation has been commenced for the foundations of the new mill, and it is expected the mill, with a capacity of from forty to fifty tons per day will be in operation within the next three months. The average grade of ore at the property is high. About forty men are on the pay-roll of the mine.

McIntyre-Newray.

According to recent rumors, it would appear possible that McIntyre Mines of Porcupine may possibly take an option on the Newray property on a working basis. The McIntyre lies about half a mile from the Newray, with the Plenaurnum property, which is now under option to the McIntyre lying between the two. Were this to become a reality, the McIntyre property would then have a length of one and a quarter miles. The plan of development and exploration of the Newray by the McIntyre would perhaps take the form of extending the drift from the 1,300-foot level of the property through the Plenaurnum and into Newray ground, as it has recently been stated that the best possibilities of Newray will be in deep mining. The diamond drilling so far carried out on the Plenaurnum property has not been as favorable as expected, however, the exploration of this property is so far very incomplete. At the present time, all that can be said of these rumors is that the plan is feasible.

Larder Lake.

The development of the property of the Associated Goldfields Mining Company at Larder Lake is being conducted energetically. The main workings of the mine have reached a depth of 500 feet and are said to be in commercial ore. At the 100-foot level, the ore body is 130 feet in width. It is planned to crosscut at the 500-foot level for the purpose of developing the ore body at this depth. It is the intention of the management to increase their working force in the early spring to 150 men. The Associated Goldfields includes several properties and is 2,000 acres in extent. At Ravens Falls, the company have a power plant, where about 1,600 h.p. is being generated, and the head developed is sufficient to increase this by several times its present capacity. The management have not made any definite arrangements for the construction of a mill, awaiting the further development of the property to determine the equipment which will be necessary for the handling of the ore.

Otisse.

The work of breaking a road to the Otisse property is one of the first steps to be taken by the purchasers of this property. Men are being taken in for the erection of camp buildings. Mining equipment for the thorough exploration of the property is now on order, and it is hoped delivery will be made in time to permit

of using the winter road for transportation of this to the property. The company also intend diamond drilling the ore body at depth.

Craig.

Arrangements are being made for the formation of a company to explore the Craig claims in the township of Cairo, of the Fort Matachewan district. Supplies sufficient to meet the summer's requirements are also being taken in, with the intention of developing the property.

Gowganda.

The Crown Reserve Mining Company of Cobalt, working the Walsh claims in Gowganda, is reported to be meeting with favorable results. The shaft has reached a depth of 100 feet and is being continued to deeper levels. A force of about thirty men is engaged in the work, and development is being pushed ahead vigorously.

Three Stars.

A new company, known as the "Three Stars," is now developing the old Calumet and Montana mine. The old workings have been pumped out, and active operations are now under way. The main shaft of this property was formerly driven below the 200-foot level, and more or less encouraging results were met with. It is said the new company is well financed for the carrying on of aggressive development.

Work Suspended at Croesus.

Operations at the Croesus mine in Munro township have been indefinitely suspended. This announcement came as a considerable surprise to everyone, as the property is said to be the richest gold mine in the world. The decision to close down is said to be due to the fact that the mine is privately owned and the owners prefer to leave the gold unmined until economic conditions improve, when the profits will be infinitely larger than at the present time. One of the chief handicaps under which the Croesus mine has to work is the fact that coal for motive power must be hauled from the railway at Matheson, a distance of about twelve miles, and another is that the price of wood has recently been increased by the settlers in the neighborhood from whom a large supply was being obtained. It would not be surprising were the owners of this rich mine to build a transmission line to the property, possibly from the Kirkland Lake camp, pending the time when operations at the mine will again be resumed.

Hill Gold Mines.

Further additions to the machinery at the Hill Gold Mines property at Painkiller Lake have been made recently, with a view to speeding up development at the property. Like the Croesus, the main vein is not very wide, but contains highly satisfactory values. In some places the gold is visible to the naked eye, and sometimes it occurs in the form of tellurides. This company also owns a number of claims in the Boston Creek district on which considerable work has been done, with more or less encouraging results.

The La Rose Discovery.

Developments on the Violet property of the La Rose mining company, east of the O'Brien mine, are of a very important nature. The main shaft has been driven to a depth of 430 feet. At a depth of 410 feet considerable lateral work has been done. The formation is made up of diabase and Keewatin, the former overlying the latter. As is well known, the best chances of encountering ore of a commercial grade is in the horizon below where the two formations meet, and it is at this point where the LaRose is conducting the exploration and de-

velopment campaign on the Violet. So far three veins of varying depth and composition have been encountered. These veins are of a substantial width and mineralization. No intelligent estimate of their future relation to the production of the mine can at present be made. However, even in the initial stages of development the results are intensely significant, indicating the great possibility of the veins being a continuation of the auriferous zone which has yielded such a large amount of silver on the O'Brien mine. The fact that the zone carries a series of veins would appear to indicate the possibility of the veins being consistent. Further lateral work is being conducted, including the driving of a crosscut to the south.

NEW NOVA SCOTIA MANAGEMENT.

Nova Scotia Steel results in 1917 were decidedly disappointing if taken at their face value. The net for dividends of \$1,340,477 represents a heavy decline of \$764,001 or 36.4 per cent. from the previous year. Added to this is the fact that the common stock was increased 100 per cent. during the year, half by sale of new stock at par and half through a common stock dividend. In 1916 the company earned \$33.70 per share on \$7,500,000 common. In 1917 common share profits on the \$15,000,000 stock now outstanding were but \$8.40 per share, which would allow none too large a margin over the \$5 dividend rate.

The explanation of the poor showing last year lies entirely in the fact that the new management has been house-cleaning. All the cob-webs have been brushed down, the walls scrubbed and the corners bored out. The result is that the company has charged off a lot of dead items, has sweetened up its inventories, its accounts receivable, its depreciation accounts and has put its accounting system on a thoroughly modern basis.

The actual net profits of Nova Scotia Steel in 1917 were in excess of the \$2,104,478 earned in 1916. The charge-offs, however, cut down the balance for dividends to \$1,340,477.

The company has plenty of orders and unless further occasion exists to charge heavily this year Nova Scotia should make a materially better record in 1918.—Boston News Bureau.

U. S. COAL PROBLEMS.

Chicago—George H. Cushing, editor of Black Diamond, says: "The first great mistake of our war period, as to coal, has been trying to solve the problems by rule of thumb or capricious, dogmatic and academic experimenting before understanding the problems separately, or in relation to one another. We have increased coal production 110,000,000 tons over 1914. The increase should have been 75,000,000 tons more last year to satisfy all needs. In 1918 we must retain the 110,000,000 tons gained, add the 75,000,000 tons needed and to that 50,000,000 tons more to be needed, a total of 665,000,000 tons. To do this we have to get along with 125,000 fewer miners than at end of 1916, the total being 430,000, estimating a loss of 75,000 last year and 50,000 more this year. They have been drafted, or have drifted to industrial centres, where munitions and other plants pay higher wages. To offset the loss of miners we have only 50 working days available this year in excess of 250 working days we had last year, when labor disturbances were an important influence. Car supply has not increased, while the strain upon it has.

"Vice-Pres. Schoyer of Pennsylvania, after study of the car situation, assures us that only alleviation, not

correction, is possible this year, that it will take the railroads until the end of the war to catch up with their traffic. When East a few weeks ago he looked over the Pennsylvania's records and found only 100 cars hauled over the Alleghenies in one day, compared with a normal movement of 6,000. There were 5,900 actual or potential carloads piling up to dam the next day's freight current.

"Apart from direct coal requirements, we must supply from American coal enough by-products to support 1,500,000 troops shooting away the powder. We can do that quite well. We can get along without potash by using common salts, nitrates and coal tar products. But the question of coal production and distribution is very serious."

TUNGSTEN ORE DISCOVERED IN MANITOBA.

Scheelite has been found in the Falcon Lake district, Manitoba, near the molybdenite deposits discovered last fall. This tungsten ore was found by a prospector who had attended the evening classes for prospectors at the University of Manitoba. The ore was brought to the instructor, Mr. J. S. DeLury, by Mr. J. MacMillan and was identified as scheelite. It is noteworthy that the molybdenite discovery last fall was also made by a prospector who attended the evening classes at the University.

IRON AND STEEL PRICES.

Iron Age says: New York conference of iron and steel manufacturers on March 1, attended by about 75 representatives of the industry, brought out plainly the divergent interests of large and small producers as affected by government prices. While the Steel Corporation and some of the larger independent companies would probably accept without complaint a continuance of present prices, smaller producers in several lines, notably plates, show advances in costs on which they contend strongly for higher government prices after March 31.

WILL BUILD STEEL PLANT IN B.C.

Ottawa, March 16.—Arrangements have been completed by New York capitalists for the establishment of a steel plant in British Columbia. The lease has been signed in Ottawa for a tract of the Indian Reserve on the north arm of the Fraser River near New Westminster. The lease is for twenty-one years, renewable for twenty-one years more.

Work on the plant is to start in sixty days and the company is to commence with fifty tons of steel a day, the output to be increased to one hundred. Steel billets, rods, plates, etc., will be rolled. The electrical process will be used in the manufacture.

EXPECTS TO RECOVER MONTREAL MARKET FOR COAL.

Montreal, March 18.—The pessimistic views of the Hon. Mr. Armstrong, Minister of Mines, of Nova Scotia, regarding the future prospects of the Dominion Coal Company in the St. Lawrence market are not shared by Mark Workman, president of the company.

Mr. Workman, in discussing the outlook said to-day that the Dominion Coal Company would have little difficulty starting in where they left off in the St. Lawrence market, just as soon as tonnage was available to bring the coal here. He said that it was true that the business had disappeared for the present, but the quality of the Dominion Coal made it popular here; and always brought a better price here than American coal.

ORE SHIPMENTS.

During the month of February ten Cobalt companies shipped an aggregate of 26 cars of ore containing approximately 2,128,376 pounds of ore. The following is a summary of the February record:—

Shipper.	Cars.	Pounds.
Buffalo	11	928,625
Dominion Reduction	4	322,000
McKinley-Darragh	3	280,520
La Rose	2	190,764
Coniagas	1	88,000
Hudson Bay	1	82,313
Aladdin	1	66,000
O'Brien	1	64,830
Penn Canadian	1	52,909
Kerr Lake	1	52,408
Total	26	2,128,376

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.25 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 17 cents per lb.

Mar. 25, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10½ cents per lb.

Lead, 9½ cents per lb.

Tin, 98 cents per lb.

Antimony, 16 cents per lb.

Copper, casting, 38 cents per lb.

Electrolytic, 31 cents per lb.

Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Mar. 25, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York cents.	London pence.
Mar. 7	85½	42½
Mar. 8	85½	42¾
Mar. 9	85½	42¾
Mar. 11	86	42¾
Mar. 12	86½	43
Mar. 13	86½	43
Mar. 15	86½	43
Mar. 18	87	43¼

Mar. 19	87¼	43¼
Mar. 20	88¼	43¾
Mar. 21	89¾	44½
Mar. 22	90¾	45

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock & Mining Exchange, March 22, 1918:

Gold.	Bid.	Asked.
Apex .....	.05¾	.05½
Boston Creek .....	..	.20
Dome Extension .....	.09¾	.10¼
Dome Lake .....	.24½	.25
Dome Mines	8.25	8.55
Imperial .....	.01½	.02
McIntyre	1.36	1.37
Hollinger	5.10	5.15
New Ray .....	.18	.18½
Porcupine Crown .....	.16	.18
Vipond .....	.20	.22½
Preston East Dome .....	.03	.03½
Teck-Hughes .....	.48	.51
West Dome .....	.13¼	.13½

Silver.	Bid.	Asked.
Adanac .....	.08½	.09½
Bailey .....	.04¼	.05
Beaver .....	.26	.27
Buffalo .....	..	1.00
Ferland .....	.09½	.10½
Coniagas	3.05	3.25
Crown Reserve .....	.20	.25
Gifford .....	..	.02¾
Great Northern .....	.03	.04
Hargraves .....	.07	.07½
Hudson Bay	35.00	37.00
Kerr Lake .....	..	5.35
La Rose .....	.62	.63
McKinley .....	.44	.45
Nipissing	8.50	8.55
Peterson Lake .....	.09	.09½
Right of Way .....	.03½	..
Seneca Superior .....	..	.02
Temiskaming .....	.26	.26½
Tretheway .....	.15¾	..
Wetlaufer05	.05½
Provincial51½	.53
Mining Corporation	3.40	3.55
Silver, 90%		

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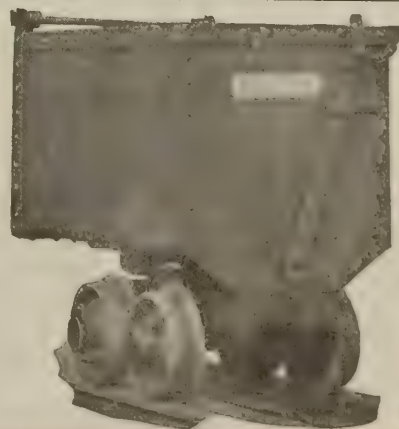
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Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 7.25.

Lead, outside, nominal, 7.25 to 7.37½.

Spelter, prompt western shipment, 7.42½ to 7.55.

Antimony—

Chinese and Japanese, nominal, 12.75 to 13.00.

Aluminum—Government price, carload lots, f.o.b. plant:

98-99% Virgin, 32.10.

98-99% remelt, 32.10.

No. 12 Aluminum Co., 32.30.

No. 12 remelt, 32.30.

Powdered aluminum, 65.00 to 70.00.

Metallic Magnesium—99% plus \$2.00 to 2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, 125.00.

Platinum (pure), \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic) \$3.25 to \$3.50.

Tungsten—

Scheelite, 20.00—24.00.

Wolframite, 20.00 to 24.00.

Gravel Flourspar: f.o.b. mines—

Prompt, \$35.00 to \$40.00.

Contract, year 1918, \$25.00 to \$28.00.

Silver (official), 89%.

Metal Products.—The following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices.

Hot rolled, 31.50 to 33.00.

Cold rolled, 32.50 to 34.00.

Copper bottoms, 39.50 to 41.00.

(Shipments from stock 2c per lb. extra).

Copper rods—Base prices.

Round, 32.50.

Sq. and rectangular, 33.50.

Copper wire—Base prices.

nominal, 26.25—26.75.

Brass Products—Base prices.

High brass—

Sheets and wire, 26.75 to 27.50.

Rods, 24.75 to 26.75.

Low brass—

Sheets and wire, 30.00 to 32.00.

Rods, 30.75 to 32.75.

Brazed tubing—

Brass, 34.75 to 36.75.

Bronze, 39.75 to 41.75.

Seamless tubing—Base prices.

Brass, 35.50 to 37.50.

Copper, 38.00 to 40.00.

Bronze, 42.50 to 43.50.

Full lead sheets, 9.25.

Cut lead sheets, 9.50.

Sheet zinc, f.o.b. smelter, 15.00.

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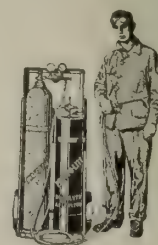
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HON. MARTIN BURRELL, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

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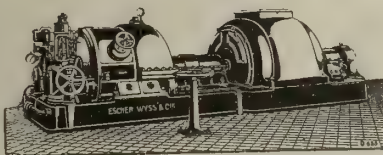
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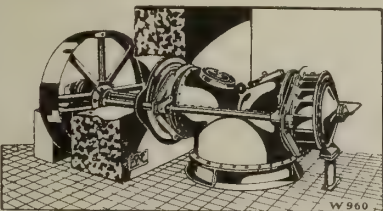
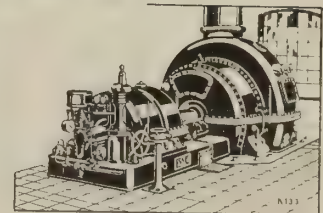
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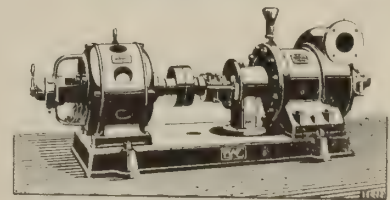
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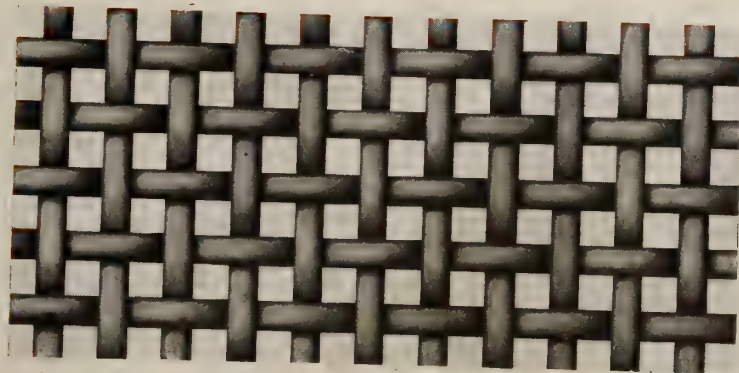
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VOL. XXXIX

TORONTO

No. 8



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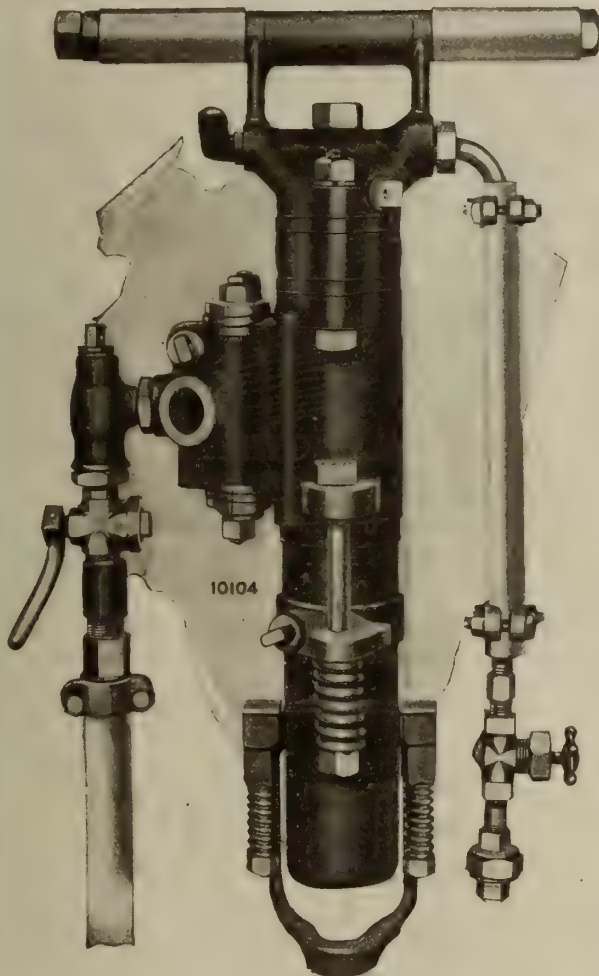
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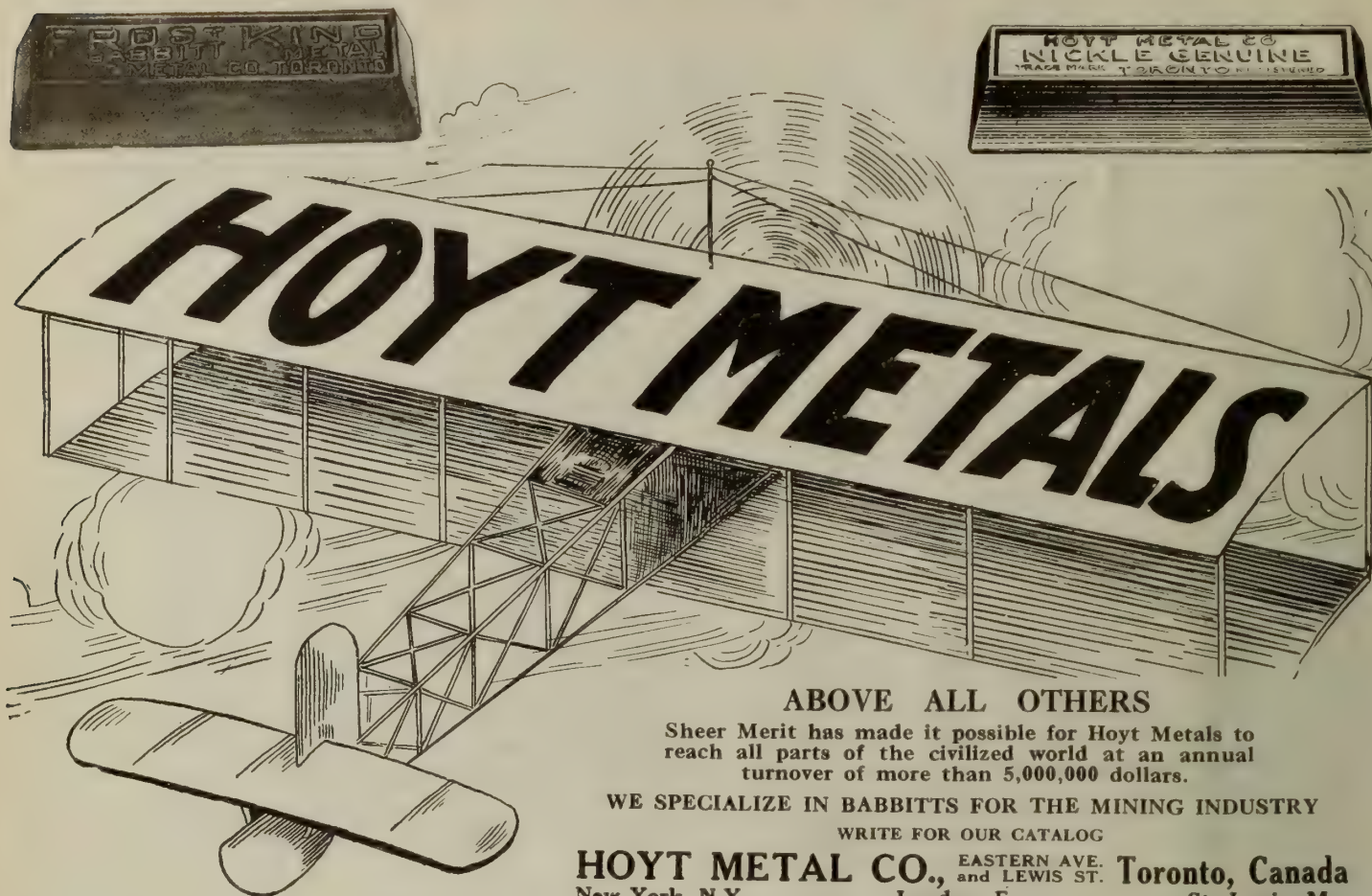
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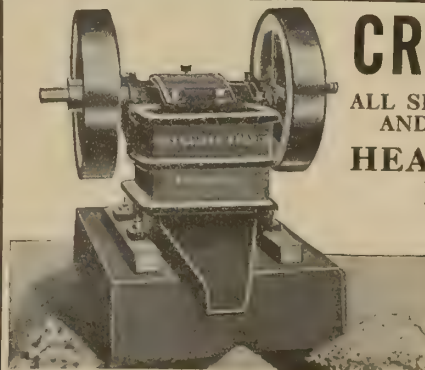
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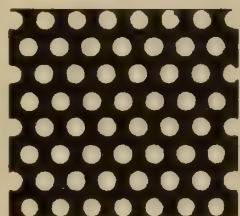
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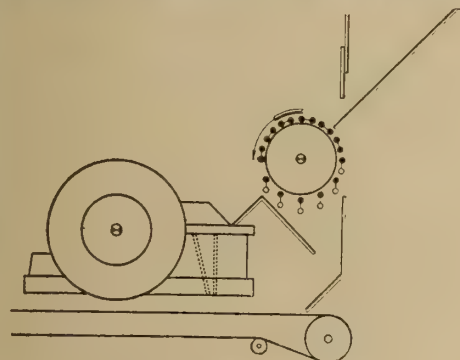
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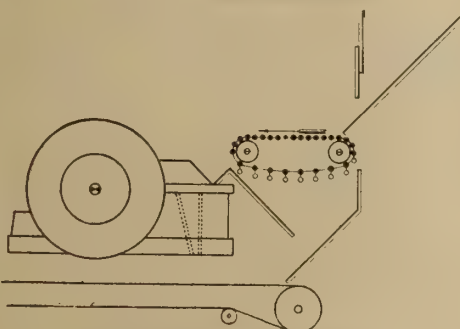
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

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THE CANADIAN MINING JOURNAL

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CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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It has been made plain by Alberta coal operators that much more coal could be produced if an all year round market could be obtained. At present there is a period of several months when some of the mines must be idle. Could not the railway companies co-operate by giving a special low rate during the months that cars are not in great demand for grain? Mr. John T. Stirling, Inspector of Mines of Alberta, in his report for 1915 said: "There is no reason in my opinion why the mines in Alberta should not be supplying the Winnipeg market."

When we consider that over 4,000 employees of the Dominion Coal Company alone have enlisted, it is not surprising that the output of coal in Nova Scotia has decreased during the war. Can nothing be done to help Nova Scotia operators to secure miners to take the place of the men who are in France?

EDUCATIONAL REFORM.

During the past few years there has been more or less general recognition of the fact that capital and labor are getting so far apart that a crash must come after the war. In the years just before the war it was believed by many that a crisis would be reached in another year or two. Some believe that the war has merely postponed the crisis, the united action of men of all classes against the common enemy naturally causing differences to be more or less hidden but not removed.

Many believe that a better understanding between classes must result from the life on the battlefield, and there can be no doubt that such belief is well founded. Threats of strikes at home, strikes which might sacrifice the lives of those at the front, prevent anyone from assuming, however, that more than a temporary solution of the labor problem has been found. If differences are so difficult to reconcile while the enemy threatens, is it surprising that many expect an industrial revolution after the war?

Expectation of trouble is based on the assumption that little effort will be made to remove the differences that exist. Whether expectations are realized or not will depend on the success of those who endeavor to solve the problem that is always presenting itself. We can take it for granted that the old condition of affairs will not be accepted as satisfactory. How can a satisfactory basis be found?

Mr. C. V. Corless, of Coniston, Ontario, who has taken a keen interest in this problem for years and who has recently presented his views to members of the Canadian Mining Institute, believes that we must start at the bottom. He considers that the indispensable groundwork upon which a change for the better must be founded is a thorough social and economic training along sane lines, running through our entire educational system from common school to university. Mr. Corless' papers and addresses have attracted a great deal of favorable comment and we may expect to hear much discussion on educational reform in the near future. The Canadian Mining Institute has already taken action as a result of Mr. Corless' efforts and passed the following resolution, submitted by President A. A. Cole, at the annual meeting.

"Whereas in view of the enormous importance that capital and labor should co-operate amicably, and in view of the fact that, in the opinion of this meeting, the present antagonistic relations between capital and labor are largely the result of economic misunderstanding of the true relationship of industry to the welfare of the society as a whole; Be it resolved that this Institute endorses the general position set forth in the series of papers presented by Mr. C. V. Corless as to the necessity of educational reform as a basis for the correction of this misunderstanding; And be it further resolved that

the Secretary of the Institute be instructed to forward a copy of this resolution, with copies of the papers in question to the Engineering Institute of Canada, the Society of Chemical Industry, the Canadian Manufacturers' Association, the Pulp and Paper Association, the Textile Association, and other industrial national bodies, with the request that they consider the reform advocated, so that joint action can be taken in bringing the matter to the attention of the educational authorities of the Dominion."

CANNEL COAL.

Cannel coal has long been a will-o'-the-wisp to coal men, and to many of them its mere mention brings up visions of wealth. The reason becomes obvious when its price on the market is compared with that of ordinary bituminous coal, for in days past cannel coal has sold in the New York market at a price about three times that of the best bituminous coal and perhaps double the price of anthracite. This high price is due to old causes—strong demand and weak supply.

As a coal for use in office and household grates, as an enricher of coal gas, and as a quick-firing coal for use in fire engines and otherwise, cannel coal has filled a unique place; and these uses coupled with its scarcity in the earth have made it an object of much search and of many disappointments, because wherever it is found there has usually proved to be very little of it.

Of late years, however, fewer grates are used in the office and the home, and water gas, enriched with oil, has replaced the old type of coal gas, so that when the European war broke out the demand for cannel coal as such had largely disappeared. Then some people remembered that many years ago, before oil was struck in the country, houses were lighted with oil obtained from cannel coal. They remembered that on distillation cannel coal yielded more oil and gas than could be obtained from ordinary bituminous coal. They realized that the sudden demand for high explosives for use in the war required the utilization of the by-products formed in the distillation of coal, and they argued that if cannel coal when distilled yielded more oil and gas than other coals it should be very rich in the by-products from which benzene, toluol, and other explosive bases are made, so a demand was made for information about cannel coal. To supply this information the United States Government, through the Geological Survey, Department of the Interior, has just issued a report on the cannel coals of the United States, describing cannel coal in detail and telling where it can be found. This report refers to every place where cannel coal has been found or where it is said to occur. It contains references to nearly a hundred and fifty such places in one State alone, Kentucky.

The fact that cannel coal does yield large quantities of oil and gas is confirmed, but it is found that this oil, though suitable for ordinary burning, distills at a temperature so low that the percentage of gasoline, benzene, and other desired substances it contains is very small, and until some way has been discovered of distilling it at a higher temperature or of cracking or otherwise converting the oils found into the oils desired the distillation of cannel coal will not furnish the large supply of gasoline, benzene, toluol, and other substances that are now so greatly needed.

MOLYBDENITE IN NORWAY.

Norway has been for several years an important producer of molybdenite. At pre-war prices the industry was evidently not a profitable one; but it is said that the few regular producers are now making very large profits and dozens of new companies have been formed to take advantage of the high prices which can be obtained in Norway. In view of these reports of fabulous profits we are naturally interested in the cost of producing molybdenite in Norway. Some light on this matter was given by Mr. Ernest R. Woakes at a meeting of the Institution of Mining and Metallurgy in London on Jan. 17th, 1918. Mr. Woakes recently visited most of the molybdenite mines in Norway and he says of the cost of production "no mine produces a ton of 75 per cent. concentrates at a less cost than \$2,500, with the abnormal cost of labor, materials, etc., in Norway at the present time." If the Norwegian producers had to accept the price fixed in England and forced on Canadians by the molybdenite embargo they would soon be bankrupt.

ELECTRICAL INSPECTION AT ONTARIO MINES.

Section 37 of The Power Commission Act, as enacted by section 10 of The Power Commission Act, 1916, is amended by adding thereto the following subsection:

This section shall not apply to any mine as defined in The Mining Act of Ontario, save only as regards any dwelling-house or other building not connected with or required for mining operations or purposes or used for the treatment of ore or mineral.

DOLLAR SILVER.

Washington, April 9.—Melting into bullion of not more than 250,000,000 silver dollars now in the Treasury for sale and export, to pay trade balances, and repurchase of silver at \$1 an ounce, is proposed in an Administration bill introduced to-day by Senator Pittman of Nevada as an emergency war measure. Silver certificates would be withdrawn from circulation as the dollars are taken from the Treasury, and Federal Reserve Bank notes of new \$1 and \$2 denominations substituted. If enacted, the measure virtually would fix a standard price for silver at \$1 an ounce.

BIG GUNS.

London, April 3.—Rear-Admiral T. B. S. Adair, of the Parkhead Steel Works, Glasgow, commenting on the "mystery" gun, says that as far back as 1909 a certain 12-inch gun of Scottish design was tested at Woolwich and some very remarkable and unprecedented ballistics were obtained. The gun could easily throw a 700-pound projectile of modern contour a distance of sixty-two miles, at an expense, however, of shortening its life to about forty rounds, but it could then be relined. The recent German spectacular effect obtained with a 24-centimeter gun can be reproduced by British gunmakers whenever required.

Charles M. Schwab says: "The German gun which has been bombarding Paris may do for killing women and children at long distance, but I doubt its military value. We could make such a gun easily. It might be made practicable for certain distances, but I still believe it to be of little military use for 60 up to 100 miles. There is under construction an American gun which shoots a 16-inch projectile 59 miles. That is the gun we are building for coast defence at Sandy Hook."

Civil Engineers Discuss Fuel and Power Problems

A meeting of the Canadian Society of Civil Engineers was held in Toronto on March 26th and 27th, to discuss the fuel and power situation. A number of papers were presented at the sessions. Interesting discussions followed the reading of the papers. The program was as follows:—

Opening address, by Sir William Hearst, Prime Minister of Ontario. The Fuels of Canada, Mr. B. F. Haanel, Chief of Fuel Division, Department of Mines, Ottawa. Discussion, Mr. L. M. Arkley, M. Can. Soc. C. E., Assistant Professor of Mechanical Engineering, Toronto University. Transportation from the Fuel Viewpoint, Mr. W. N. Neal, General Secretary of The Canadian Railway Association for National Defence, Montreal, Que. The Rational Development of Canada's Coal Resources, Mr. W. J. Dick, A.M. Can. Soc. C.E., Mining Engineer of the Commission of Conservation, Ottawa, Ont. Utilization of Peat, Mr. John Blizard, A.M. Can. Soc. C.E., Technical Engineer, Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa, Ont. Discussion, Mr. James Milne, M. Can. Soc. C.E., Mechanical and Electrical Engineer, Department of Works, City of Toronto. The Low Temperature Carbonization and Briquetting of Bituminous Coals, Mr. E. Stanfield, Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa, Ont. An illustrated address on "The Erection of the Quebec Bridge," Mr. Geo. F. Porter, M. Can. Soc. C.E., Engineer of Construction, St. Lawrence Bridge Company, Montreal, Que. Ontario's Efforts to Relieve the Fuel Situation, Mr. Albert Grigg, Deputy Minister, Department of Lands and Forests, Ontario, Toronto, Ont. Wood as an Emergency Fuel, Mr. E. J. Zavitz, Provincial Forester, Ontario. Gas for Light, Heat and Power, Mr. Arthur Hewitt, General Manager Consumers' Gas Company, Toronto. Central Heating as a Means of Conserving Fuel, Mr. F. G. Clark, M. Can. Soc. C.E., Chief Engineer, Toronto Electric Light Company, Toronto, Ont. Oil Fuel and the Possibilities of its Use, Mr. R. W. Caldwell, Chief Mechanical Engineer, Imperial Oil, Limited, Sarnia, Ont. Canada's Water Powers and their Relation to the Fuel Situation, Mr. J. B. Challies, M. Can. Soc. C.E., Superintendent of Dominion Water Power Branch, Department of the Interior, Ottawa, Ont. Discussion, Mr. H. G. Acres, M. Can. Soc. C.E., Hydraulic Engineer, Hydro-Electric Power Commission of Ontario, Toronto, Ont. Railway Electrification, Mr. John Murphy, M. Can. Soc. C.E., Chief Electrical Engineer, Department of Railways and Canals, Ottawa, Ont. The Possibilities of the Relief of Fuel Consumption in Canadian Industry by the Increased Use of Hydro-Electric Energy, Mr. J. M. Robertson, M. Can. Soc. C.E., Director, Southern Canada Power Co., Montreal, Que. The Possibilities of Lessening Fuel Consumption in Canada by the Adoption of Electrical Heating, Mr. P. H. Mitchell, A.M. Can. Soc. C.E., Consulting Engineer, Toronto, Ont.

Premier Hearst Addresses Engineers.

Sir William Hearst extended a hearty welcome to the engineers. Sir William said he was pleased to welcome such an eminent body of scientific men, and that added interest would attend their conference because they were to discuss the fuel question. While coal had not been discovered in Ontario, there were, however, numerous waterfalls, by which power could

be developed. The resources of peat were as yet unknown, but money had been provided by the Legislature to deal with the problem and experiments would be carried out. A co-operative scheme had been agreed upon between the Dominion and Ontario Governments on the question of peat fuel, and fuel distribution had also been discussed. While the peat resources could not be relied upon for next winter, the Government had taken up the question of wood supply, and it was hoped enough wood would be secured to meet emergencies.

B. F. Haanel Urges Development of Fuel Resources.

B. F. Haanel, Chief of the Fuel Division of the Department of Mines at Ottawa, read an address upon "The Fuels of Canada." Mr. Haanel declared that if Canada was to-day largely dependent upon coal and oil from the United States, it was due to apathy toward the development of home resources, not to the scarcity of the fuel within the Dominion. "We have been culpably neglectful of our fuels," he declared. "And some day in the future we will be faced with great suffering if we do not now render our own fuel resources available." Mr. Haanel contended that Canada had fuel resources sufficient to make her independent of the United States if they were developed. He read to the engineers statistics to show how largely Canada was depending upon the States and presented estimates of her resources of coal and peat. Canada, he said, had 37,000 square miles of peat bogs. The conversion of these bogs into good commercial fuel involved no particular research work. It had been made into excellent fuel for domestic and industrial purposes for many years in European countries. In closing, Mr. Haanel advocated concerted pressure to get vigorous development of Canada's Resources.

The big item in connection with peat, in the opinion of George W. Allen, secretary-treasurer of the Canadian Gas Association, was that peat could be used for producer gas and the by-products turned into so many uses that great efficiency and economy resulted. The fact that peat could replace bituminous coal in this regard made it almost a national crime to use coal for purposes of producing gas.

W. N. Neal Tells What Railways Have Done.

W. N. Neal, general secretary of the Canadian Railway Association, was not able to be present to deliver in person his address upon "Transportation From the Fuel Standpoint." The address as read to the members was an instructive review of the problems the railways had faced and overcome in connection with the shortage of fuel. Mr. Neal estimated the haulage of coal as one-fifth of the total tonnage handled by the railways, and that coal, he stated, had been carried farther in Canada for less money than any other country in the world. It cost less to haul a ton of coal 60 miles than to team it a mile in the city of Toronto. The address told of the efforts made by the railways to relieve the coal scarcity by instituting radical economies. The reduction in the number of passenger trains had effected a saving of 600,000 tons of coal. The number of sleeping cars had been reduced, observation cars eliminated, and the freight loads increased. In closing, Mr. Neal said that the railways took a great deal of pride in their record in regard to the carrying of fuel.

W. J. Dick Suggests Improved Methods of Utilizing Our Fuel Resources.

W. J. Dick, Mining Engineer of the Commission of Conservation, spoke upon the rational development of Canada's coal resources. "Canada," he said, "has 16.4 per cent. of the world's coal, Great Britain 2.4 per cent., and the United States 51.8 per cent. The coal fields of the United States and Canada have the largest proportion of the world's resources of coal and with the exhaustion of the coal fields of Europe those countries will have to look to North America.

Mr. Dick stated that production of coal in Canada had doubled every twelve years since 1874, yet had not kept pace with the increase in consumption. Mr. Dick was of the opinion that while in the east and the west Canada had large deposits of bituminous coal, she had little anthracite for domestic use. To make up that deficiency he suggested that the future would bring with it the production of artificial anthracite made from bituminous coal with gas, ammonia and tar as valuable by-products. The municipal gas plants of to-day would form the basis of a new organization.

"It is not beyond the bounds of reason," he said, "to foresee the day when the householder, in place of his \$10 ton of coal and slate, will receive a ton of smokeless artificial coal, gas for a month, enough ammonia to fertilize a small garden and enough tar to cover the road in front of his home, all for less money than he is now paying for inferior coal." Mr. Dick contended that two million tons of coke had been used in the United States for domestic purposes, and the fact that the gas companies with small plants could produce quantities of coke showed the possibilities of the coke industry.

Mr. Dick suggested that the area to be served from the Western Canada coal fields could be enlarged by special railway rates during the season when the grain was not being moved, the coal being stored at delivery points. This would ease the drain upon imported coal and would give steadier labor conditions at the mines, an important consideration in securing increased production. Mr. Dick also advocated a pooling of interests by the mines in order to secure economic development of the coal fields.

John Blizard Discusses Utilization of Peat.

Mr. John Blizard, Technical Engineer of the Division of Fuels and Fuel Testing, of the Mines Department, in dealing with peat, expressed his opinion that it was to assume an important role in Canadian industrial life in the future. Mr. Blizard discussed at some length the methods of taking raw peat, extracting the moisture and making it commercially profitable. He gave the gathering an idea of the tremendous resources of peat that are to be found in various parts of the Dominion, particularly in Ontario. A peat bog to be a commercial proposition should be at least five feet deep. A square mile of bog, ten feet deep would contain about 800,000 tons of dry peat, or 1,100,000 tons of air dried peat with 25 per cent. moisture.

In commenting upon the possibility of peat competing in price with coal and other fuels, Mr. Blizard stated that peat, if produced in any quantity, could be made cheaply since most of the labor required was unskilled. In concluding his address, Mr. Blizard declared that the inauguration of peat fuel as an important industry in Canada could not be long delayed.

The concluding address of the Tuesday afternoon session was by E. Stanfield, of the Division of Fuels and Fuel Testing of the Mines Branch at Ottawa, on

low temperature carbonization and briquetting of bituminous coals. At the evening session, George F. Porter, Engineer of Construction for the Quebec Bridge, gave an illustrated address on the erection of the bridge.

The efforts which Ontario is making to relieve the fuel situation were dealt with by Mr. Albert Grigg, Deputy Minister of Lands, Forests and Mines. The use of wood as an emergency fuel was taken up by Mr. E. J. Zavitz, Provincial Forester, who said it was vitally necessary to educate the people in rural districts to the importance of cutting wood during the summer for winter use. Mr. Zavitz showed that fuel wood costs \$12 to \$15 a cord, and that a cord of wood in heating capacity was equal to only half a ton of coal, so that at this rate the people will be paying from \$24 to \$28 for the equivalent of a ton of coal.

Arthur Hewitt on Uses of Gas.

The importance of manufactured gas among the economic fuels on which Canada may rely was explained at the convention by Mr. Arthur Hewitt, general manager of the Consumers' Gas Company, of Toronto.

Mr. Hewitt estimated that the percentage of efficiency obtained from coal in a gas works is between 60 and 70 per cent., while that of a ton of the same fuel burned in an open fire is less than 20 per cent. In addition to the gas, many gallons of tar, from which toluol, benzine, fuel oils, acids, and dyes can be made, is recoverable. There is also retort carbon, which is used for the manufacture of carbon electrodes for searchlights, electrical steel furnaces, and other uses. Mr. Hewitt said that if gas were used for cooking exclusively in Toronto, compared with anthracite coal, there would be a saving of \$2,000,000 a year.

F. G. Clarke Points Out Advantages of Central Heating System.

Mr. F. G. Clarke, chief engineer of the Toronto Electric Light Co., advocated the use of central heating plants for towns and cities. Mr. Clarke's up-to-date heating system would necessitate steam mains laid in city streets. He says: "A well designed system as, for example, one covering that part of Toronto between the bay and College Street and from Sherbourne to Spadina Avenue, if supplied from a central plant, such as the Scott Street station of the Toronto Electric Light Co., would be able to furnish all of the heat required in the district at a cost to the users from 10 to 30 per cent. less than their present expense."

Mr. Clarke predicted that gas and briquettes made from powdered coal will replace the coal now used in Canadian cities. The powdered coal could be delivered in pipes just as oil is now being conveyed from the well to the seaboard in the United States. "The cost of the gas and the briquettes will be less than one-half, and possibly one-fourth, the present prices for gas and coal."

Canada's Water Powers Should Be Used More Fully.

"Cheap power promises to be one of this country's greatest assets in the post-bellum industrial rivalry of nations for world trade," pointed out Mr. J. B. Chalkies, Superintendent of Dominion Water-power Branch, Department of the Interior, in dealing with the relations of Canada's water-powers and their relation to the fuel situation. The great fuel reserves of Canada, supported by the water-power resources, represent a sure source of cheap power, and should, he claimed, guarantee Canada her share in world trade, provided

the varied fuel-power resources are availed of to a maximum extent.

It is axiomatic, claimed Mr. Challies,* that our heat, light and power needs must be considered as one great national problem. While the Pacific and Atlantic Provinces are self-sustaining, the Central Provinces, he said, were dependent on outside sources for coal. The "acute fuel area" is dependent for domestic requirements mainly upon Pennsylvania anthracite, and for industrial needs upon American bituminous coal, as well as upon water-power.

This "area," however, he said, could eventually be made independent of foreign fuel imports and Canada could become self-sustaining, at any rate in respect of her domestic heating requirements.

In 25 years there has been developed and put in use nearly 1,800,000 water horse-power. Only about 10 per cent. of Canada's available water-powers has been developed. If Canada is to reap full benefit from her heritage in white coal there must be a constructive liaison between the Dominion and Provincial Government administrative departments concerned in water-power matters.

Electrification of Railways Would Help.

In a paper on railway electrification, Mr. John Murphy, chief electrical engineer of the Department of Railways and Canals at Ottawa, said the elimination of the need for coal at a considerable distance from the mine is a greater measure of relief and of true conservation than increasing mine production, and thereby adding to the load of the already over-burdened railways. Reducing coal consumption automatically releases men and apparatus all along the route from the mine to the consumer, and also helps to prevent railway congestion.

Railway electrification will reduce coal consumption and haulage, and it will greatly improve traffic conditions. It seems, therefore, to be a solution of the problem.

"Railway electrification is, in my opinion, a very pressing, economic, financial and engineering problem—a problem worthy of the best attention of the most highly trained and experienced specialists," said Mr. John Murphy. "From 50 per cent. to 60 per cent. of the coal now used would be saved if electric locomotives were used."

In dealing with "The Possibilities of the Relief of Fuel Consumption in Canadian Industry by the Increased Use of Hydro-Electric Energy," Mr. J. M. Robertson, Director of the Southern Canada Power Company, Montreal, said that economic utilization of power and fuel resources would limit the present use of irreplaceable materials and promote the use of other materials whose use would conserve the assets of a community.

Electric heating is not a present economic possibility, due to high cost and lack of available power, according to Mr. P. H. Mitchell, consulting engineer, who read a paper on "The Possibilities of Lessening Fuel Consumption in Canada by Adoption of Electrical Heating."

\$5,000,000 PLATE MILL FOR SYDNEY, N.S.

Ottawa, April 4.—Additional information with respect to the Federal Government's programme for the construction of steel ships to be used in meeting the

shortage of merchant vessels on the Atlantic, and the agreement between the Government and the Dominion Iron and Steel Company looking to the construction of a plant for the rolling of ship-plates in Canada was contained in the statement of Hon. C. C. Ballantyne, Minister of Marine and Fisheries, in committee of supply in the Commons to-night.

Hon. Charles Murphy asked if the shipbuilding programme of the Imperial Munitions Board and that of the Government were in any way connected. Mr. Ballantyne replied that there was absolutely no relation between them. The Minister of Marine said that one difficulty which had confronted him when he first took into consideration the question of steel shipbuilding was that Canada had no plant for the rolling of steel plates. If Canada was to be a ship-building country it was necessary that a steel mill be established in the Dominion. He, therefore, took up with the various Canadian steel companies the question of establishing a rolling mill in the Dominion. The best proposition submitted by the Government was that of the Dominion Iron and Steel Company, of Sydney, which agreed to install a rolling mill which would cost in the neighborhood of five million dollars, all of the money to be furnished by the company.

The contract which the Government had entered into with the steel company was concluded on the following basis, the Dominion Government guaranteed to take a minimum tonnage of 50,000 plates per year for five years. The price per plate for the moment was \$4.15, but this would have to be adjusted every six months on the basis of the cost of steel ingots. The mill would run for six months, turning out steel plates, and then the price to be paid by the Government would be determined. The contract provided that no higher price than \$4.25 should be charged the Government, and if the prices of ingots went down that of steel plates should be lowered accordingly. Government accountants would be placed in the office of the company to see that the prices were adjusted correctly.

The Minister of Marine said that the new mill would probably be in operation in twelve or fifteen months. All machinery which the company had to import would have to pay duty on entering Canada, but this would be refunded to the company. Until the mill was ready to supply steel plates, the shipbuilding programme would be carried on with plates supplied from the United States. The Government had been fortunate in securing 80,000 tons of steel plates at a reasonable price through the British War Mission at Washington.

BRITISH-AMERICAN NICKEL CO.'S REFINERY.

Ottawa, April 10.—The British-America Nickel Refining Company, which has been negotiating for property on which to erect a refining plant for some time, has decided to locate on the Hull side of the Ottawa River.

It is learned that representatives of the company have purchased the property known as the old Conroy piling grounds, at Deschenes, upon which a nickel refining plant, to cost in the neighborhood of \$1,000,000, will be erected. The company will employ at least one hundred and fifty hands.

Preparations have already been made for a start on the construction of the plant as soon as the frost leaves the ground.

Accuracy in Coring with Diamond Drills

By Joseph S. Mitchell.*

The increased use of diamond drills in locating ore-bodies and mineral deposits, together with the fact that mining engineers now depend largely on their use in preliminary developments, has directed attention to the various methods and devices employed for the purpose of producing the most accurate results.

While a diamond drill, even when carelessly operated, will invariably detect the presence of minerals, engineers now demand accurate and reliable data to enable them to determine with some degree of exactness the quantity and quality of the mineral sought, so that it is possible to put the property on a definite commercial basis before development is begun and equipment purchased.

In coring minerals, it is important to use the proper core barrel for the particular kind of material to be cored. For hard, solid rocks, the single tube core barrel is regularly used and no difficulty is experienced in getting full and accurate core. This barrel consists of a single tube, as its name indicates, to which the diamond bit is connected by a taper core shell. The shell is fitted with a taper split ring core lifter, which tightens on the core as the barrel is withdrawn, due to the locking effect, when it is forced into the taper of the core shell.

The water for washing out the cuttings passes directly down, over and around the core in this type and with hard, solid core will, of course, do no harm. When the cores are soft or the formation is full of natural cleavage planes, it is desirable to protect the core against washing and also to avoid the tendency of broken core, even when hard, to wedge when subjected to the pressure of moving water.

The most usual conditions, under which special barrels are used to secure core, in such material, are those found in coal formation. It is usually customary to drill with the plain or single core barrel down to within a few feet of the point at which it is expected the coal seam will be encountered. The drilling rods are then pulled up, the plain core barrel removed and the double tube core barrel substituted for it. For many years the Sullivan swivel ball bearing tube barrel has been the type in perhaps most extended use throughout the North American coal fields, for this class of drilling. It consists of an inner and outer casing, the latter being attached to the drill rods and rotating with them. This carries the diamond bit and the core lifter at the lower end. The inner casing is suspended on ball bearings inside of this tube, and remains stationary at all times, receiving the core, which passes up through the bit and core lifter, and protecting it from the friction of the rotating parts and from the washing action of the water, which is forced down between the outer and inner barrels. The return water then comes up, outside of the outer casing.

The use of this barrel is recommended for all coal prospecting, and has been the means for securing practically full cores, in nearly all cases, where it has been employed. This type of barrel is also recommended for drilling in salt, sulphur and other materials which are friable or soluble on contact with water.

Simpler types of double-tube barrels are sometimes employed in hard mineral prospecting, when the formation is encountered at an angle, or is unusually broken, so that there is danger that the short pieces of core may be ground up and the record lost. In this design provision is made for returning part of the water through the inner tube, instead of letting it all pass up, outside of the barrel. A small opening at the top of the core barrel connects with the inner tube, and the water coming back through this tube is discharged into the hole, at this point. The lifting effect occasioned by the upward rush of the water aids to loosen and free the broken pieces of core, preventing clogging and consequent grinding of the pieces. The water ordinarily passes down between the two tubes.

In a still simpler form of barrel, sometimes used, the inner tube is rigidly attached to the outer casing, and prevents washing. This does not give as good results as the return water barrel, described above.

It is interesting to note in this connection that an important advantage of the diamond drill consists in the small size of the hole in which it bores, and the relatively small size of the cores removed. Experience of more than a third of a century has indicated that the diamond drilling process can, and does, remove, satisfactory and complete, accurate records of any mineral which it is desired to prospect in this way, with cores not exceeding two inches in diameter for friable formations, such as coal, and running down to 15-16th of an inch in diameter for hard, solid mineral formations. The small size of the drilling tools used enables much better progress to be made at a relatively lower operating cost than is possible with larger drilling equipment.

The core barrels described above are manufactured by the Sullivan Machinery Company, of Chicago, whose Canadian office is at 37 Colborne St., Toronto.

NORTHERN MANITOBA MINING NEWS.

Mandy Has 9,000 Tons Copper Ore Ready to Ship.

The Pas, April 1st.—The Mandy Mining Co. has now 9,000 tons of ore at the head of navigation, awaiting the opening of the lakes and the Saskatchewan River. It will be carried to the Pas by steamboat and barge, where it will be shipped by rail to Trail. It is expected that ore will come down at the rate of 900 tons a week during the summer. Three steamboats and six barges will be put at the work by the Ross Navigation Co. Twelve cars shipped this month to Trail were freighted by returning teams.

Diamond Drilling at Flin Flon and Cranberry Lakes.

The Flin Flon syndicate will continue drilling with three diamond drills all summer on their big property.

A Duluth concern has a diamond drill at work on some claims at Cranberry Lakes.

An option has been taken by a large eastern mining company on a group of claims at the end of Phantom Lake, south of the Flin Flon group, on which diamond drilling operations will be commenced next October.

Mill at Herb Lake Completed.

Herb Lake is also soon going to be in the limelight; the mill on the Rex is now completed and should be producing gold inside of thirty days.

The Northern Manitoba is making a shipment of ore to Trail and will probably resume work shortly.

Active development work is expected to start on several other promising properties with the advent of spring.

*Sullivan Machinery Co.

Origin of Sudbury Nickel-Copper Deposits

In a paper presented at the recent annual meeting of the Canadian Mining Institute and the American Institute of Mining Engineers, H. M. Roberts and R. D. Longyear said in part:

The genesis of the Sudbury ores has been a subject of keen debate for a number of years. The data brought to light by this exploration, which has developed one of the large orebodies of the district, lends a new emphasis to some phases of the problem, and it will be of interest to discuss in a general way the facts concerning the deposits and the various conclusions which may be drawn from them.

The apparently conflicting theories of origin are all based upon certain facts. These facts, as distinguished from inferences, are enumerated below:

1. The ore generally occurs at or near the margin of the main norite mass. Where the ore is not near the main laccolith ("offset deposits"), norite is always found associated with the ore, or in close proximity to it.

2. The ore minerals are later than the rock-forming minerals of the norite.

3. The ores penetrate and replace the foot-wall rocks to some extent.

4. The rock associated with the ore appears to be more or less brecciated.

5. The walls of the commercial orebody are usually sharply defined, mineralogically.

6. The norite wall is always spotted with sulphides. The foot wall is sometimes spotted, and sometimes barren.

7. The mineralogical content of the "marginal deposits" is singularly uniform with a fairly constant ratio between the amount of pentlandite and pyrrhotite, although with a slightly more variable quantity of chalcopyrite. The content of the "offset deposits" is not as uniform as that of the marginal deposits.

8. The usual minerals accompanying typical hydrothermal deposits are scarce or lacking, and in many places the norite associated with the ore is unaltered.

9. The norite laccolith has been differentiated into an upper stratum of acid material and a lower stratum of basic material. Within the basic material are minor amounts of acid rocks.

On the basis of these facts, a number of hypotheses concerning the genesis of the Sudbury ores have been offered. In general, they fall into two classes: those which postulate a magmatic origin, and those which postulate that the ores are the result of a later introduction by hydrothermal solutions.

The Relation Between the Exploration and Theories of Origin.

A choice between the various hypotheses is a matter of great importance to the explorer who is endeavoring to conduct a rational search for ore. Such a choice of views is important not only in reference to the value of any one parcel of land along the contact but also in regard to the handling of any one drill hole. There is one condition common to all of these theories: The orebodies that have now been found do occur along the contact of norite with some other adjacent rock. This is true not only of the sill as a whole, but of the offsets as well; although in many of the offsets, sulphides occur throughout norite dikes. Thus any lands along the norite contact might be expected to carry ore. The explorer must answer this question: Which lands among

those along the norite warrant the greatest expenditure for the purpose of finding ore? Every consideration that will help in solving this difficult problem is of great importance.

When this exploration was started, the later publications by Tolman and Rogers and by Knight were not available, but a study was made of existing publications.

In the early stages of the work, drilling was carried on, simultaneously, in various townships along the nickel range. As far as the immediate local facts in the field might show, all of these localities presented about equal opportunities for finding a body of ore. It may be of interest to record briefly the results of the exploration in the various townships, touching particularly upon the factors which determined the course of the work.

In the Township of Levack, on the north limb of the basin, three holes were drilled between the Strathcona mine and the Levack mine. The relative position of these mines led to the belief that ore might be found along the norite contact between them. Only one hole was drilled to the contact. This hole is typical of many of the holes drilled and is therefore described. It started in a uniform phase of the norite and continued in this for a depth of 500 ft. the proportion of pyroxene and basic minerals increased as the hole deepened, and many anhedral pyrrhotite appeared. Between the depths of 500 and 600 ft., portions of the core were composed largely of basic minerals; other portions were plagioclase feldspar. These segregations gave to the rock the appearance of having a gneissoid structure. Within this material were found a few occurrences of pyrrhotite and chalcopyrite, each attaining perhaps to as great a volume as 1 cu. in. At 600 ft., the drill encountered the coarse-grained, flesh-colored granite of the footwall, decidedly different from any of the rock above.

Drills working in the Township of Trill in the western part of the district and in the Townships of Denison and Blezard, encountered much the same types of norite with segregation phenomena near the contact as described in connection with the drill holes in Levack. No commercial quantities of sulphides were found, which, of course, does not necessarily mean that such bodies may not be found. Meanwhile, drills were at work in the Townships of Falconbridge and MacLennan in the eastern part of the district. Typical norite was encountered there also, after penetrating the glacial drift. The norite at the contact in Falconbridge differs in no degree from the norite encountered elsewhere, except that outcrops to the north indicate that the basic portion of the intrusive sill is wider than in the other localities where drilling was done. In attacking this region, it was planned to refrain from deep, costly rock drilling until the position of the contact had been definitely determined by "scout" holes which would merely penetrate ledge for a few feet. These were put down through the drift for the purpose of marking out the position of the contact; thus the deeper holes had a definite basis for the choosing of their location. In the early stages of the work, one hole near the contact was drilled to a depth of 600 ft. in norite but did not encounter footwall rocks, thereby indicating that the norite contact had a steep dip.

At this time, lands in the Townships of Bowell, Wisner and Graham were also available for exploration, but it was decided not to drill them. The drills were withdrawn from Levack, Trill, Denison and Blezard

and the exploration was concentrated upon the Townships of Falconbridge and MacLennan where the contact was largely concealed by glacial covering, but where, so far as known, the norite had the same mineralogical characteristics at the immediate base as the norite found during the course of the other explorations. In addition to the drilling, and while it was in progress, studies of many portions of the norite contact were made in the field wherever it was exposed to view.

As a result of this work and of a consideration of all the large field relationships as shown on the maps of the Sudbury District, the following general condition had been becoming apparent: The quantity of sulphides which may be expected to occur at the contact of the nickel-bearing intrusive is roughly proportional to the volume of the adjacent norite. The surface expanse of the nickel-bearing intrusive and its thickness as shown by the dip at the contact both go to show what the volume of the tributary nickel-bearing intrusive may be.

The one great expanse of nickel-bearing intrusive in the district which, so far as known, did not have a commensurate body of sulphides accompanying it, lay in the eastern part of the district in the Township of Falconbridge. The nickel-bearing intrusive in this vicinity has a much greater width than in the Townships of Wisner, Howell and Levaack on the north, or Trill on the west. The norite has a great width in the Townships of Denison and Blezard, but the accompanying orebodies had already been discovered; i.e., Crean Hill mine and Blezard mine. Hence, it was decided to concentrate on the contact in the Township of Falconbridge, even though it was covered by 150 to 200 ft. of gravel and boulders.

In this connection, it may be noted that in regions where the offsets are highly mineralized, the adjacent basic margin does not yield orebodies, i.e., in the region of the Worthington and Mond mines, the marginal contact of the main intrusive is quite generally exposed and no orebodies have been found along it. In the region of the Frood mine, which is found on an offset, the margin proper does not yield orebodies, indicating that the metallic content which was a portion of the magma in these vicinities, when found in one place does not occur in quantity in another portion of the "horizontal cross-section" or plan now exposed by the erosion surface. This relationship is, of course, rough, discernible only in broad outlines, but is sound evidence for the conduct of exploration, safer than speculation arising from more detailed features of any one hand specimen or any one orebody. General evidence of this kind is more likely to be a safe guide for the projection of work in unknown areas, since the reasoning proceeds from the nature of the intrusive process as a whole, not from any one phase which may be dominated by local conditions.

While the discovery of ore in Falconbridge Township as a result of assuming a relation between the volume of norite and the volume of sulphides may be only a coincidence, nevertheless, the outcome is a strong indication that some such close relationship actually does exist.

Another factor which has been emphasized by this exploration is the intimate association of the ore with the norite. In Falconbridge Township, it usually occurs at the immediate contact, the hanging-wall being entirely norite and the footwall entirely quartzite. Where the ore is actually within the quartzite (or

greenstone) it is never more than 20 or 25 ft from the base of the norite. Moreover, the drill core often shows that the gangue within the ore is norite, while the rock above and below may be quartzite or greenstone.

This is well illustrated in Hole 308, a cross-section of which is shown. Below the main body of ore, the drill passed through 16½ ft. of barren quartzite only to enter again a 2½ ft. stringer of rich ore containing small included particles of norite. The association of the norite with this last shoot of ore is extremely suggestive, and points strongly to the fact that they both came from the same source and were closely contemporaneous.

Summary.

By way of summary, a possible succession of events which produced the Sudbury ores is outlined below:

A laccolithic mass of molten rock was intruded along a plane of unconformity beneath the Animikie sediments. Through some process of differentiation, the nature of which is uncertain, this mass separated and consolidated into two distinct but intergrading types, micropegmatite and norite. The sulphides were carried downward with the norite. As the norite consolidated, these sulphides remained in solution and were concentrated in association with an acid component of the magma. This segregation or "extract" made its way to the base of the norite under the influence of complex chemical and physical forces. At the very last stage in the consolidation of the norite, the sulphides were precipitated from the "extract" along the contact, and at the same time, the acid component solidified into granite. The presence of water, sulphur, and possibly other mineralizers in the magma, gave this extract somewhat the character of a solution, enabling it to replace the wall rock to some extent. But it was still so intimately related to the magma that it was unable to carry the sulphides any great distance into the foot-wall, unless also accompanied by the molten norite.

With this point of view, it is merely a question of emphasis whether these ores are considered to be of magmatic or hydrothermal origin. The point we have tried to make clear is that the dominant factor controlling the deposition of the Sudbury ores is magmatic segregation *in situ*. Hot solutions may have been active, but only served to influence the local character and position of the ores.

THE ROSS ENGINEERING COMPANY.

The Ross Engineering Company, makers of Ross box pumps for sands and slimes, automatic drop-bar grizzly feeders and ore screening equipment and automatic dump ore car system, have opened an office at 908 Eastern Townships Bank Bldg., Montreal.

Mr. Wm. Ross, general manager of the company, is well known in many mining districts. He is a graduate of the Aberdeen Technical College, Aberdeen, Scotland. After graduating he went with Messrs. Babcock & Wilcox, Limited, where he remained for a year. He was also for a year with Messrs. Box Hall Iron Works, London, England. During the next four years he was in South Africa as chief designer of the City Deep Gold Mines, Johannesburg. From there he came to Canada five years ago. During his first year here he was mechanical engineer of mines for the Canadian Copper Co., Copper Cliff. For the next three years he was mechanical engineer for the Dome Mines, South Porcupine, and during the last year he was chief engineer for Messrs. Fraser & Chalmers.

CORRESPONDENCE

Bore-Hole Exploration.

Editor Canadian Mining Journal:

Sir,—I have read with interest the article by Mr. C. H. Hitchcock, on "Bore Hole Exploration," in your issue of January 15th, and also the letter by Mr. C. J. Harrington in your issue of March 15th, in which he takes issue with Mr. Hitchcock's statement that the "Knight and Stone" core barrel is considered the best double tube core barrel on the market.

Mr. Harrington, by his statements, proves that he is not familiar with the core barrel, which he undertakes to describe, or with the results obtained by the use of the different types of double tube core barrels.

The "Stone Patent" core barrel, which is also known as the "Knight and Stone" core barrel, is provided with means for causing a portion of the circulating water to flow back or upward through the core barrel, thus exerting pressure below the core and raising the broken pieces of rock or mineral. This prevents these pieces from being ground away on the piece of core below and therefore lost. This return water principle is not confined to the rigid type of double tube core barrel; but is also used with two different styles of ball-bearing double tube core barrels; these are shown in the patent drawings and are manufactured and sold by the Diamond Drill Contracting Company of Spokane, Wash., and the E. J. Longyear Company. However, these ball-bearing styles are recommended by the patentee and manufacturers only for very soft material, for like the Sullivan Machinery Company's type, they are short lived either in hard or alternating hard and soft material. But little if any more core can be saved with the stationary inner tube ball bearing type of core barrel in soft material than by intelligent handling can be saved with the "Stone Patent" rigid type double tube core barrel.

The "Sullivan" core barrel, like the "Stone" ball bearing type, is hung on ball bearings; but it is solidly plugged or closed at the upper end. If a piece of soft core such as clay or sticky shale is crushed in the lower end, or in any other part of the barrel, water must necessarily fill the balance of the barrel and when so confined and prevented from escaping by the crushed soft material it will act as effectually as a bar of iron in preventing the barrel from passing down over further core. If the drilling is continued all core will be ground away and lost.

With the "Stone" barrel, of either type, the water escapes freely from above the crushed piece of core and the water pressure from below assists in raising the core and freeing the block.

Mr. Harrington states that the "Sullivan" double tube core barrel is universally used for drilling in coal. I do not doubt that it is extensively used, as is all of the Sullivan machinery equipment which is widely advertised. He, however, fails to state that where this core barrel is used ninety-five per cent of the drilling is done with some other type of core barrel, usually the old single tube type, and the ball bearing core barrel is used only to cut through the coal. Whereas the "Stone" type of core barrel is used for the entire length of the hole and I have never heard of it having been superseded by any other type for drilling through the softer friable material.

Where the "Stone" core barrel has been introduced it has practically replaced all other makes, single and

double tube alike. Ninety per cent. of the drilling in the Western States and British Columbia from California to Alaska is done with the "Stone" return water types and largely with the rigid style. The advantage is not alone in the value of the core saved, for in saving a greater percentage of what may be useless hard rock core an increase in the footage drilled is made and a decrease in diamond breakage amounting from ten to fifty per cent is accomplished. This, in itself, when recognized, should cause the "Stone" return water core barrel to supplant all others.

One of the purchasers and users of the "Stone" core barrel, Mr. M. Ahearn, of Denver, Colorado, has a patent double tube core barrel without the return water feature, this is superior to the "Sullivan" double tube core barrel or any other of that type known to the writer in that the construction allows for the lubrication of the ball bearings, which are protected from the action of the circulating water. It also allows for the use of larger and stronger thrust balls.

Yours, etc.,

FRED STONE.

Box 947, Spokane, Wash., U.S.A.
March 30, 1918.

\$400,000 FOR EXPERIMENTAL PLANT.

Ottawa, April 7.—The Advisory Council for Scientific and Industrial Research has been informed by the Government that the Council's recommendation that a plant be erected in the Province of Saskatchewan for the production of a high-grade domestic fuel from the lignite of eastern Saskatchewan has been approved. The Government has provided a sum of \$400,000 for the construction and operation of this plant.

In this undertaking the Dominion Government is acting in co-operation with the Governments of the Provinces of Saskatchewan and Manitoba.

The Council has received a request from the Ontario Government asking that R. A. Ross, C.E., one of the members of the Council, be appointed to act with Arthur Cole, C.E., as a committee to take immediate steps for the development of the peat bogs of Ontario, and the production from them of a merchantable fuel. The Research Council has concurred in these appointments and the investigation will be proceeded with.

Winnipeg, April 10.—It is stated that an arrangement has been entered into between the Federal Government, the Province of Manitoba, and the Province of Saskatchewan, whereby a plant for the manufacture of anthracite briquettes from prairie lignite coal will be established in the Estevan district in Saskatchewan.

The plant will cost \$400,000, the Federal Government putting up \$200,000 and the Provinces \$100,000 each. The plant will become the property of the two Provinces on its completion. The Federal Government has charge of the erection of the plant, and it is expected that it will be in operation by next winter.

At Victoria, B.C., the Central Iron Committee has proposed that the initial objective of the British Columbia steel delegation, when it shall meet the Federal authorities in Ottawa, shall be, first and foremost, the establishment of a pig-iron plant. The construction and operation of such a plant, it is contended, may be the thin end of the wedge that will eventually shape itself into the establishment of an important iron and steel industry on the coast of British Columbia.

"The Whitley Scheme"

By C. V. Corless.

In the creation of democratic organization for unifying the aims of Capital and Labor, Great Britain is once more the pioneer. We instinctively turn to her for industrial experience, as a child turns to a wise parent. Her experience in industry is many centuries older than ours. Her labor is much more highly unionized. Her Trade Unions have passed through two centuries of struggle. Her differences between Labor and Capital are more clearly defined. Her class distinctions, for other (historical) reasons, are more marked—a fact that has added to the bitterness between Capital and Labor. These had brought the industrial dispute in Great Britain to such a stage that, by 1914, many felt that such general strikes were imminent, as would amount almost to, if they did not end in, a revolution. The war suddenly diverted attention from the quarrel. Though some domestic bickering has continued, all parties loyally joined hands in the superhuman effort against the common enemy. The war has, at least for the present, removed from Capital all self-complacency, which was a large factor in the domestic strife. The nation is already face to face with an inconceivable debt which is mounting at an appalling rate. The food supply is threatened. The nation is about to put forth its extreme exertion. There is no room now for old quarrels. Dust and cobwebs have been cleared away. England is never at her best until her back is to the wall. It required three years of war to brush away the last cobweb of self-complacency. She is now not only thoroughly aroused to fighting mood, but has had her creative energy quickened by the crisis.

In the awful throes and agony of the past year of war, Britain brought forth an industrial idea which, if broadly and wisely backed up in future by educational preparation, seems calculated to effect such a revolution in industrial relationships as will remove the malign social results of the pernicious economic policy followed since the industrial revolution of a century ago. In the blackest year of the war, just past, the British Government appointed a Commission whose principal work was to inquire into the causes of industrial unrest and to make suggestions for removing the causes of discontent. The work was quickly and thoroughly done. The whole country was divided into eight industrial areas to each of which was detailed a small Commission of three, consisting of one representative of employers, one of labor, and an impartial chairman. Their reports will prove of great economic value. While these industrial commissions were at work, a short preliminary report was sent to each by a sub-committee of the recently created Reconstruction Department, which at that time had merely the status of a committee appointed to consider the whole problem of industrial relations from the standpoint of post-war reconstruction.

The chairman of this sub-committee was Mr. Whitley, whose name, for brevity, has been attached to the committee, to the report and to the general scheme embodied in the report. The broad recommendation of the Whitley Committee was the establishment in every organized trade of an Industrial Council, repre-

senting both employers and workpeople, and having as its object "the regular consideration of matters affecting the progress and well-being of the trade from the point of view of all engaged in it, so far as is consistent with the general interest of the community." This recommendation, modestly called an "Interim Report on Joint Standing Industrial Councils," was, in June of last year, sent to each of the eight small Industrial Commissions, who quickly secured for it a consideration by more than one hundred Employers' Associations and Trade Unions all over the country. The greatest interest in the proposal was manifested both by the industrial bodies concerned and by the press. There appeared to be at once a general feeling of relief that a possible solution had been found for what had come to be regarded as practically a deadlock. Nothing could indicate better than this feeling of relief the essential soundness at heart of both employers and employed. By October the replies had been received and correlated. The answers of nearly all of the Trade Unions and of most of the Employers' Associations were "overwhelmingly in favor of the adoption" of the general principle of the Whitley Report. Backed thus, the Minister of Labor, on October 20th, informed the Employers' Associations and the Trade Unions of the decision of the Government to adopt the Whitley Report. The document announcing this decision by the Government made it clear:

- (1) that Joint Standing Industrial Councils should be established in all the well-organized industries with as little delay as possible.
- (2) that these Councils would be considered by the Government as "official standing Consultative Committees on all future questions affecting the industries which they represent" and would be the "normal channel through which the opinion and experience of an industry will be sought on all questions with which the industry is concerned," and
- (3) that the Councils are to be "independent bodies electing their own officers and free to determine their own functions and procedure with reference to the peculiar needs of each trade." These autonomous councils will thus "make possible a larger degree of self-government in industry than exists to-day."

These Joint Standing Industrial Councils, of national scope for each well-organized trade, will be supplemented by District Councils and these again by Shop Committees, on both of which masters and men will find equal representation.

The scheme has met with the approval of the Council of the Federation of British Industries, the most representative organization of employers in Great Britain, and of the Trades Union Congress, and to all appearances is in a fair way to success.

Mr. Wilson Harris is responsible for the statement that the idea of Joint Councils of masters and men originated with Mr. Malcolm Sparkes, of London, an employer in the building and allied trades. He had "laid before the men's unions in these trades a memorandum on industrial co-operation. The Painters and

Decorators took the memorandum and applied it." Their experience with the Industrial Councils already extends over about a year, and has proven their practicability. The original purpose of these Joint Councils was, to use their official statement, "to promote the continuous progressive improvement of the industry, to realize its organic unity as a great national service, and to advance the well-being and status of all connected with it." This, as a spontaneous expression of idealism by a workmen's organization, is of deep significance. The District Councils in this trade have met regularly now for about a year under the masters' chairman and the men's chairman alternately and have successfully carried out some important constructive work at various centres in the country besides averting some disputes. The Whitley Committee is said to have received the original suggestion from this memorandum by Mr. Sparkes and elaborated it. It may later prove to be true, as in many other great movements, that when the time is ripe the same idea springs up in many minds at about the same time.

On considering the question of representation a little more closely, it seems probable that the labor representatives on the District and National Councils under the Whitley Scheme will all be trade union leaders while the representatives of the Employers will all be professional managers. The workmen at the bench or lathe or loom or in the mine or elsewhere is generally not in close sympathy or close touch with either. If he is to feel a real co-operation between those who direct and those who perform the work, it will be through the Shop Committees. Success of the scheme will largely depend on perfectly frank, human intercourse between the representatives of both Councils and Committees, but above all, of the Shop Committees. If, as is hoped, "such an atmosphere will be created that trade disputes will never be carried to the breaking point," there will have to be, of necessity, the greatest sympathy, frankness and cordiality between the representatives of the workmen and of the management on these Shop Committees.

UNIONS WANT RECOGNITION.

Sydney, N.S., Apr. 3.—Upwards of 100 delegates from all the Amalgamated Mine Workers' locals in Cape Breton assembled in convention here this morning. This conference is being held to map out a plan of campaign for the labor men, who are demanding that the corporations recognize the various unions here. Representatives of the American Federation of Labor at Sydney Mines and the Amalgamated Association of Iron, Steel, and Tin Workers of Sydney, were also in attendance at the meeting. These two unions are demanding recognition from the Nova Scotia Steel and Coal Company and the Dominion Steel Corporation. To date neither corporation will recognize the Steel Workers' organizations.

STRIKE AT LETHBRIDGE.

Lethbridge, April 9.—The discharge of an alien enemy to-day at the Federal Coal Mines has resulted in a tie-up of the mines by the union. Peras, an Austrian, is the man involved. He has been an agitator of the men. The manager refused to reinstate him in response to an ultimatum from the miners. He says he will allow no alien enemy to dictate to him. The operators have violated no clause of their agreement, the manager claims.

PERSONAL

Mr. J. B. Tyrrell is at Tulsa, Oklahoma.

Mr. G. C. Bateman, manager of LaRose Mine, Cobalt, was in Toronto last week.

Mr. C. V. Corless, manager of the Mond Nickel Co., addressed the Royal Canadian Institute in Toronto on Saturday, April 6th, on "Educational Reform."

At a meeting of the Toronto Branch of the Canadian Mining Institute on Saturday, R. E. Hore was appointed as representative of the branch on the Joint Committee of Technical Organizations.

Mr. G. W. Bowen, general manager for the Western Fuel Company, operating large coal mines in Nanaimo district, Vancouver Island, B.C., went last month to San Francisco, California, on a business visit. Control of the company is held in that city.

Mr. R. R. Bruce, manager of the Paradise silver-lead mine in Windermere division of East Kootenay district, returned to British Columbia last month, after having spent part of the winter at Honolulu, Hawaiian islands.

Mr. T. W. Bingay, of Trail, B.C., comptroller for the Consolidated Mining and Smelting Company of Canada, Limited, who recently returned from a vacation trip in the United States, was in Victoria toward the end of March.

Mr. W. R. Will, a well-known owner of mining property situated near New Denver, Slovan district of British Columbia, has returned to that province after having spent the winter in Ontario.

Mr. E. P. Mathewson and Dr. A. Stansfield have been nominated as representatives of the Canadian Mining Institute on a Canadian Engineering Standards Committee.

Messrs. A. A. Cole, Wm. McInnis, D. B. Dowling, A. W. G. Wilson, Herman Donkin, T. C. Denis, W. G. Miller, J. S. DeLury, J. T. Stirling and W. Fleet Robertson, have been appointed an Advisory Board to assist the Canadian Munition Resources Commission in a survey of mineral resources.

OBITUARY.

Bernard P. McEnaney.

Toronto, April 3.—Mr. Bernard P. McEnaney, owner of the McEnaney Gold Mines, Limited, Timmins, Ont., was found dead yesterday evening in his apartments at 1251½ Sherbourne Street. He was last seen alive on Sunday afternoon, and it is presumed that he died some time during that night. Mr. McEnaney had suffered about three years ago from acute bronchial trouble, and he was then warned by his doctor of the danger of a bronchial hemorrhage. It is believed that Mr. McEnaney sustained a hemorrhage Sunday night, and that this was responsible for his death.

"Barney" McEnaney, as he was familiarly known, was an outstanding figure in the north country. Born in Mount Forest in 1857, early in life he went to Michigan and remained there for several years, engaged in copper mining. Hearing of the mineral wealth of Northern Ontario he returned to Ontario about eight years ago, but arrived too late to share in the early stakings of Cobalt. He was, however, one of the pioneers in both the Porcupine and the Lorraine mining camps, and had valuable holdings in both. His sale of the Porcupine Crown mine to the Crown Reserve was one of the features in Porcupine's early history.

The Ross Automatic Drop-Bar Grizzly Feeders

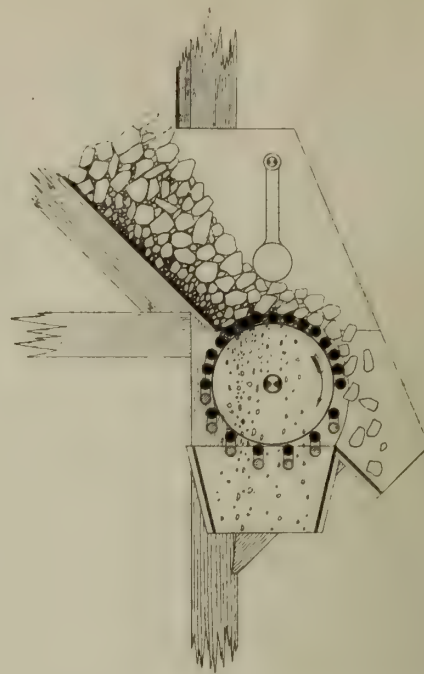
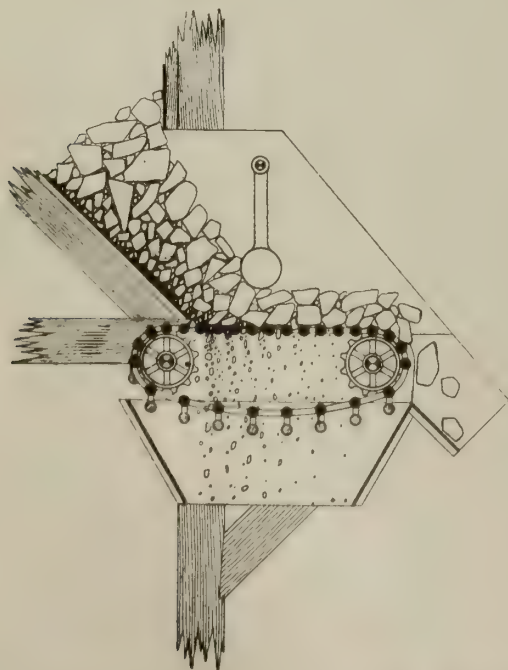
By Wm. Ross.

Ore feeders, grizzlies and screens are extremely important links in the chain of milling operations. It is on these that the crushers and other grinding machines depend for a steady flow of ore of the right size. Hitherto the close analysis granted to other milling equipment has been withheld from these machines, with the result that the mill operator is saddled with various types of faulty apparatus which are a source of continual trouble to him. Most of us are familiar with plugged grizzly, choked crusher, sledge hammer and repair gang episodes.

Many years practical study and experiment by the writer with various apparatus has resulted in the development of a machine for which is claimed the ability to **automatically feed and screen run-of-mine and crushed ore at an even rate for twenty-four hours a day without attention.**

The accompanying diagram, taken from the maker's catalogue, show the features of the rotary and travelling types of the Ross Automatic Drop-Bar Grizzly-Feeders. These diagrams show clearly the means by which the spacing of the grizzly bars is automatically increased at the underside of the apparatus.

The machines consist essentially of an apron of equally spaced grizzly bars which are fed forward under the lip of the bin opening. Every second bar, instead of being socketed at its ends, is linked to the main bar ahead of it. On reaching the discharge point these secondary grizzly bars drop down, remaining clear during the return half of the cycle, at the end of which they again automatically come into position ready for the screening and feeding operation. On the return journey to the starting point the bars do not obstruct the free passage of the fines. It should be noted here that the links carrying the secondary bars are pivoted excentrically to the main bars in such a way that the space between the adjacent bars is



automatically increased when the secondary bar drops over at the discharge point. This provides for the release of any piece of ore which might otherwise be trapped in this space. No troublesome internal fines chutes are necessary with these machines, and consequently the headroom required is very small; the discharge end of the travelling type can be elevated, thus necessitating no height allowance between the bin opening and the crusher. No other machine combines the functions of feeding, screening and elevating in such a manner.

The simplicity of construction of the Ross Grizzly-Feeders will make a strong appeal to the mill man. The rotary machine consists of two heavy cheek plates in which the main bars are journaled. The drop bars are supported by wide turned shoulders on the cheek plates. The cheek plates are keyed to heavy steel shaft which is carried by two bearings of ample size. The machine can be driven by ratchet, chain or belt. In the Travelling-bar machine the cheek flanges of the rotary type are replaced by heavy steel chains with hardened pins on which the main bars are journaled. The drop-bars are linked to the main bars, and are provided with half sockets at each end, which match the pins of each alternate chain link.

In any screening apparatus the greatest wear is caused by the abrasive action of large ore sliding over the screen bars or plates. Thus, in a revolving trommel screen ten feet long by five feet diameter, the coarse ore will slide over about one hundred feet of plate, and a piece may have tried two or three hundred holes before being discharged. The result is rapid wear of the screen and particularly the edges of the screen around the holes. Also, at the receiving end, the ore is impinged with considerable force onto the plate in a direction different to that of the plate. The Ross machine draws its own feed, which must therefore correspond in speed and direction to that of the bars. The coarse ore is carried to the discharge point without slip and consequently without wear. In most installations a speed of about twenty feet per minute is all that is necessary, and the wear caused by fines slipping through the slowly moving bars is negligible.

With regard to the self-feeding feature of the machine, it is acknowledged that the efficiency of a plant is seriously impaired if an even flow of ore from the storage bin is not maintained. A simple slide gate is not satisfactory unless constantly attended. If it is raised high enough to allow a large lump to pass, there usually results a rush of fines which flood the machine before the gate can be closed. A hanging gate, such as is shown in the accompanying cuts, works very successfully. When a large piece comes along, the gate will swing outwards temporarily to allow it to pass, returning afterwards to its normal position. In conjunction with the hanging gate, a forward motion of the feeder bars will automatically maintain a uniform flow of ore.

When the ore reaches the grizzly, the object is to, as quickly as possible, provide an escape for the fines. This is accomplished in the Ross machines—as will be clearly understood from the cuts—by applying a continuous feed of clear grizzly bars under the oncoming ore. Having passed the top screening bars, there is no possibility of the fines being trapped in the interior of the machine, because the spacing of the bars on the returning side has been doubled, and the distance between the bars has been increased three or four times. The coarse discharge from these machines will be uniform over the width of the apron, a special advantage where rolls, jaw crushers, etc., are being fed.

Over a dozen machines are already installed with screen spaces of from one-half inch to three inches, and negotiations are at present being completed for the installation of heavier machines, notably one with eight-inch screen spaces. This machine will handle very large run-of-mine ore at the rate of 350 tons per hour when the bars are moving at a speed of thirty feet per minute. The bars are three and one-half inch diameter, and the calculations show that twenty-five feet of grizzly surface will be presented to each ton of ore.

The mining world has responded promptly to the unique advantages offered by these machines, and manufacturing facilities are in full working order to meet the demand for quick shipment.

CROW'S NEST PASS COAL CO.

Toronto, April 13.—Through the combined influence of a five months' strike and the shortage of labor, 1917 was anything but a satisfactory year for the Crow's Nest Pass Coal Company, the report submitted to the annual meeting at the head office in Toronto yesterday showing the quantity of coal mined to be 504,768 tons, against 910,839 for 1916. The coke produced was 146,533 tons, compared with 268,980. In spite, however, of the marked decrease in production, the company was able to carry forward to the credit of profit and loss account the sum of \$381,103, compared with \$322,480 at the close of 1916. During the year the company spent on improvements and developments \$125,102, which included payment for the Coal Creek branch railway purchased from the Canadian Pacific Railway.

A press despatch from Whitehorse, Southern Yukon, follows: Recently fire destroyed the plant of the Copper King Company, while in operation in Whitehorse copper camp. The power-house, boiler-room, with power plant and compressor, were ruined. The Copper King property is being worked by Mr. J. P. Whitney and associates. The mine has been shipping ore steadily. Rebuilding will be commenced at once, and new equipment be obtained as soon as can be.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Decrease in Nova Scotia Coal Output.

The coal output of the Nova Scotian mines for the first quarter of the year is probably the lowest for a decade. The outputs of the Dominion Coal Company show a decline below last year to the end of March of 130,000 tons. The Allan Shaft mine of the Acadia Coal Co. is still idle, not having resumed operations since the explosion in January. The Nova Scotia Steel and Coal Co. have had interruptions to production through weather and labor troubles, as have the Inverness mines also. Generally speaking, production is at the lowest point since the early part of the war period. The best that can be hoped for during the remainder of the year is that production may be maintained. No possibility of increasing production is in sight; but there are a good many reasons to expect still further declines in outputs.

A New Coal Mines Act for Nova Scotia.

A new Coal Mines Regulation Act is before the House of Assembly. It contains a good deal of new matter, principally in relation to the use of explosives and the duties of examiners and shotfirers, no doubt suggested by the recent colliery explosions. All who work under the C. M. R. A. will welcome a consolidation and a more logical arrangement of its provisions, as from year to year amendments have been introduced, and repealed, and re-introduced, until the Act has become rather mixed up.

Some of the legislation introduced into the Nova Scotia House bears evidence of hurried and superficial preparation. A striking example was the Nova Scotia Stationary Engineers Act, recently brought down, and given what is vulgarly termed the "three months' hoist." As drafted, this Act was full of grammatical and typographical errors, and the textual contents were full of indefiniteness. The principle of the Act was praiseworthy, as similar legislation—but more carefully thought out—has been in existence in other provinces for many years.

Before legislators introduce bills, why should they not consult those men who have spent their lives in practical experience of the conditions which the draft legislation is intended to regulate? A process of consideration and re-drafting, of consultation of those interested, of comparison with similar legislation in other countries, of enquiry as to the success or non-success of similar legislation abroad, may very well, and very profitably consume two or three years, but after such a process, there would emerge legislation that would stand criticism and the test of actual application. A classical example is the Coal Mines Regulation Act of Great Britain. Passed in 1870, it was not consolidated and revised until a few years ago. Before it was issued in the new form, most exhaustive enquiries were instituted through the medium of technical societies, trades unions, coal-owners' associations, etc. The preliminary process was most exhaustive and possibly just as tiresome, but while the resulting Act probably did not please the extremists on either side, it is a workable, coherent, comprehensive piece of legislation, thoroughly well understood by all who assisted in compiling it. In its final form such an enactment represents not the opinion of legislators—which in technical matters must necessarily be faulty—but the unified embodiment of men

actively engaged and thoroughly familiar with the industrial operations the enactment in question is designed to govern.

Nova Scotia Coal Miners' Wages Increased.

The earlier part of the year witnessed rather protracted negotiations in the Sydney District over wage adjustments. The question has been satisfactorily settled at the mines of the Dominion Coal Company both in Cape Breton and at Springhill, and also at the collieries of the Acadia Coal Co., in Pictou Co., and the Inverness Mine in Cape Breton Island. An agreement was understood to have been reached between the workmen of the Nova Scotia Steel and Coal Co., and the Company, similar in scope to that on which the Dominion Coal Company settled with its workmen, but some hitch has arisen as to whether the increase offered will be cumulative upon a number of rather unusual concessions which the Scotia Company has granted within recent years, in lieu of specified adjustments on a percentage basis. It seems unlikely that any trouble will supervene of a serious nature, but at the time of writing the matter is not settled.

The increase given by the Dominion Coal Company was retroactive to the 1st of January, so that the workmen received two months' increase in a special pay envelope at one time. The increase which is under negotiation with the Scotia Company is likewise retroactive, and should the matter be happily settled, the cumulative increase for over three months will amount to a very considerable sum.

Mining Society of Nova Scotia will Resume Meetings.

The annual meeting of the Nova Scotia Mining Society is arranged for the 1st and 2nd of May. Since the very successful meeting held by the Society in April, 1914, the annual meetings have not been held in customary form, because the Society felt some impropriety in doing this under the strain of war conditions. In 1917 the annual meeting occupied only one day, and some extremely interesting and pertinent papers were read; but owing to the short session, they were not adequately discussed. A number of these papers are selected for discussion at the forthcoming annual meeting, and as advance copies have been distributed to the members, it is thought a profitable and mature discussion of the problems they present will take place. Some new papers are expected, and it is anticipated that the resumption of annual meetings of a normal character will show that the Society has not lost any prestige by its voluntary policy of retrenchment during the first few years of the war. This policy has placed the Society's finances in a much more favorable condition than they were in some years ago. The Annual Dinner will be held, but its features will be modified to conform with war times. As the meeting extends over two days, and as the visiting members must dine in any case, it has been considered advisable not to any longer deprive the members and the Society of the advantages which accompany the social features of the annual meeting. During the past three years the sum of \$100 has been annually donated to some patriotic fund as representing the saving to the Society from dispensing with the usual features of the Annual Dinner, which is probably the best justification of the action of the Executive in its policy of abstention and retrenchment.

It is anticipated that the question of affiliation between the Mining Society of Nova Scotia and the Canadian Mining Institute will receive final consideration from the Mining Society's members at the forthcoming meeting.

BRITISH COLUMBIA.

To Investigate Smelter Charges.

Continuing the agitation against the methods of the Consolidated Mining and Smelting Company in regard to charges and terms of settlement in connection with the smelting of silver-lead ores, Mr. Chas. F. Caldwell, of Kaslo, who is largely interested in mining properties in Ainsworth mining division, recently appeared before the mining committee of the Provincial Legislature, and asked, on behalf of the Independent Mine-Owners' Association, that an investigation be made into the existing situation. He claimed that the charges now made by the smelting company are unfair, and that they have been steadily increased until now they have reached a point where the smelting company absorbs all the profits.

The Victoria Daily Colonist has published the following information on this matter:

"Denial of Mr. Caldwell's statement was made by Mr. J. J. Warren, Managing Director of the Consolidated Company, who contended that the new rates, which became effective on February 1, last, would not yield to the company more than a reasonable profit.

"Mr. Warren stated the company had made an offer to allow a committee from the miners to examine its books and go into the whole matter, but this offer had not been accepted. He could not see his way to agree to a Government commission. It would cost \$30,000 to \$40,000 and would accomplish nothing. No commission could force the company to do the work at less than cost plus a reasonable profit, and this was the situation now.

"A resolution was offered by Mr. J. H. Hawthornthwaite that a commission be appointed to go into the whole matter, the commission to consist of one representative of the smelting interests, one from the miners and one from the Government. No action was taken on the motion. It will be taken up at a future meeting of the committee."

Investigation agreed upon.—Meanwhile, action by the Provincial Government seems to have been rendered unnecessary by the attitude of the Dominion Government, as reported by The Trail News, as under:

"Advices from Ottawa state that the Dominion Government has agreed to the appointment of the committee nominated by the Associated Boards of Trade to make an investigation into smelting rates of the Consolidated Company and will provide the necessary funds. It will also pay for the employment of an expert accountant and an expert metallurgist to assist the committee in making the inquiry.

"Information to this effect has been received by Mr. Fred A. Starkey, of Nelson, president of the Associated Boards of Trade of Eastern British Columbia, from Messrs. Lorne A. Campbell and W. A. Anstie, who were delegated to go to Ottawa and place the matter before the government with the request that the committee be given the powers necessary."

WEST KOOTENAY.

Ainsworth.—On March 21 the Kootenayan, published at Kaslo, included the following in its week's mining news: "After spending about \$130,000 in development on the United, Crow Fledgling, and Skyline properties, in Ainsworth camp, the A. W. McCune interests have quit that field. The reason given for the move is said to have been some friction with the unions. All of the camp materials and outfit used at the various pro-

perties is being brought down the hill and disposed of at a sacrifice."

Mr. F. R. Wolfe, of Spokane, Washington, president of the Florence Silver Mining Company, operating a mine and concentrating plant in Ainsworth camp, has been quoted in print as having said lately: "In the lowest level of the company mine near Ainsworth the best ore yet found in the mine has been uncovered. There is a full face of ore which is estimated to contain 30 per cent. lead. All ore previously mined here contained half an ounce of silver to the unit of lead, so it is believed the silver content of this newly opened ore shoot will be found to average 15 oz. of silver to the ton. Ore of this grade has occurred along the last 100 ft. of the drift on the No. 3 level, which is at a depth of about 700 ft. from the surface. For 200 ft. previously driven the ore was of a good milling grade, but not equal in value to that in the last 100 ft." Several weeks ago 209 tons of mill product was shipped to Trail by the Florence Company.

Slocan.—The Echo mine, situated above the Standard, in Silvertown camp, last month shipped 46 tons of silver-lead ore to Trail. The Ivanhoe, near Sandon, was another small shipper. The Lucky Jim has this year shipped, also to Trail, 1,016 tons, chiefly of zinc ore. The Lucky Thought, operated by the Consolidated Mining and Smelting Company under option of purchase, has shipped 85 tons lately. The Rambler-Cariboo's total this year is only 114 tons. The Surprise total is 1,142 tons. Small shippers include the Best, Freddie Lee, No. 1, and Richmond-Eureka. Shipments from Slocan City division have been very light. All the quantities just given are of ore received at Trail from the beginning of the year to March 21, inclusive. The Standard Silver-Lead Mining Co., operating near Silvertown, Slocan Lake, is stated to have been lately shipping about 1,000 tons of zinc concentrate monthly to smelting works in the United States. The Galena Farm also near Silvertown, is expected to shortly resume shipment of both silver-lead and zinc concentrates, operations having been resumed last month after suspension during the winter. There is ore in quantity at several other mines, but this is being held awaiting improvement in marketing conditions.

Nelson.—Five properties in Nelson mining division are on the Trail list of shippers for this year. The Molly Gibson, at the head of Kokanee Creek, in the north-eastern part of the division, one of the Consolidated Co.'s mines, has shipped 251 tons of silver-lead ore; the Emerald, near Salmo, 199 tons of lead ore; the Beasley-Monarch, about nine miles west of Nelson, 84 tons of copper ore. Small lots of ore have been received also from two or three properties in the southern part of the division.

Rossland.—Out of a total of 88,694 tons of ore received at Trail since the end of 1917, 51,636 tons was from mines in Rossland camp in the following proportions: Le Roi, 23,560 tons; Centre Star group, 22,333 tons; Le Roi No. 2 Co.'s Josie group, 4,607 tons; and White Bear, 1,136 tons. The Josie is the only one of the producing mines in Rossland camp not owned by Consolidated Company. The Le Roi No. 2, Ltd., also shipped ore to other smelting works for a while.

GENERAL NOTES.

Last month it was stated in Vancouver that a shipment of some 200 tons of gold and silver ore from Mexico to Ladysmith, Vancouver Island, was reshipped

south, owing to there not being any smelting works operating in the lower coast district of British Columbia at the time. The ore was brought to British Columbia owing to the shippers not being aware that the Ladysmith Smelting Corporation had suspended smelting following exhaustion of the then available supply of ore for its works. The Mexican ore was taken from Ladysmith to Vancouver, where arrangements were undertaken to reship it to San Francisco.

Hedley Reincorporated as a B.C. Company.

Announcement was made in Victoria last month to the effect that the Hedley Gold Mining Company, incorporated under the laws of the State of Delaware, is to be re-incorporated as a British Columbia company, with registered office in Victoria. This action followed a decision of the directors which was put into effect during a recent visit to Victoria of Mr. I. L. Merrill, of Los Angeles, California, president, and Mr. G. P. Jones, of Hedley, Similkameen district of British Columbia, general superintendent for the company. The Hedley Gold Mining Company has been operating for a number of years the Nickel Plate group of gold mines and a 40-stamp mill in Camp Hedley. The value of the company's output has averaged nearly \$800,000 a year, and dividends have been paid at the rate of 25 per cent. per annum for most years and 30 per cent. during two or three years.

Gold Mining on Princess Royal Island.

The following information relative to the gold mine on Princess Royal Island, which has been considerably developed in recent years by the Belmont-Canadian Mines, Ltd., understood to be an offshoot of the Tonopah-Belmont company operating in Nevada, was made public in Victoria last month: "The company has been developing this property with conspicuous success for some time past. Last month the net profit was \$30,000. The value of the production this month is expected to be between \$90,000 and \$100,000, with a net profit of about \$40,000. Lately a new tube mill has been installed, by means of which the quantity of ore milled will be increased. Mining and milling costs are \$5.30 a ton and the recovery is about 92.5 per cent or \$10 a ton. Extraction will be increased 1.5 per cent." In his last-published official report the district inspector of mines stated that "the mine proper is situated seven miles inland from the head of Surf Inlet, at an altitude of 1,000 ft. So far three distinct ore-lenses have been opened and developed to a depth of 1,000 ft. vertically from the outcrop, and more than 13,000 ft. of drifting done . . . The hydro-electric station is being built near tidewater; the structure will be composed of concrete throughout, and the plant will be capable of generating 1,500 horse-power, with a water-head of slightly more than 50 ft. A mill and concentrator with a capacity of from 250 to 500 tons is being installed at the mine; also, machine-shops, power-house, etc., which will be operated entirely by electricity transmitted from the hydro station at tidewater. Considerable clearing has been done at the mine, and a townsite laid out on which the company will erect up-to-date cottages for its employees, also stores, recreation rooms, etc. When in full operation this mine will give employment to 300 men." Since that report was made, additional development has been carried out underground, the mill and concentrator completed and operated, and shipment of mill product to smelting works in the United States is now being made. The brief comment included in the official "Preliminary Review" published in Victoria early in the current year was as follows: "The

first production from the Surf Inlet mine since its acquisition by the present owning company is interesting, and important, a considerable output being expected, the result of four months' operation. The property is equipped with a 250-ton mill which commenced milling in August. A considerable gold production in the future from this property seems assured."

The Emma mine, in Boundary district, owned and operated by the Consolidated Mining and Smelting Company, continues to ship copper ore to Trail. Its total for the current year, as at March 21, was 8,216 tons. The Iron Mask, in Kamloops mining division has made an output of 643 tons.

COAST COPPER CO., VANCOUVER ISLAND, B.C.

The Trail News, published in Trail, B.C., last month printed the following account of a recent deal in connection with the only copper-mining property on Vancouver Island, British Columbia, on which a large amount of development work has been done in quite recent years:

A mining transaction of great interest to Vancouver Island has just been consummated by the taking over of a seventh interest in the holdings of the Coast Copper Company in Quatsino mining division, by Mr. George E. Snyder, of Spokane, Wash. The consideration is understood to be about \$150,000, the shares having been transferred from Messrs. M. W. Bacon and W. E. Cullen, who are still interested in the company. The controlling interest is held by the Consolidated Mining and Smelting Company of Canada. The Coast Copper Company was organized last August.

Mr. Snyder closed the deal, which has been pending for several weeks, after conferring with Mr. J. J. Warren, managing director, and Mr. W. M. Archibald, manager of mines for the Consolidated Company, in Trail, on March 8 and 9. Speaking of the Quatsino property, in which he has great faith, Mr. Snyder said:

"I was assured by Mr. Archibald that development of the Coast Copper Co.'s property had reached a point which justified construction of a railway. He also told me a survey for the railway had been completed from Quatsino Sound to the property and that the holdings of the company had been enlarged recently.

Railway and Smelter Projected.

"Development has proceeded steadily. Mr. Archibald said the result obtained on the lower level strengthened the belief that the property would become a large and profitable producer.

"To finance the development and equipment a bond issue of \$750,000 was authorized. This sum was ample, it was calculated, to complete development, build a 12-mile railway and erect smelting works to have an

initial capacity of at least 500 tons a day. The entire bond issue was underwritten by the Consolidated Company. Only a little more than \$100,000 worth of these bonds have been issued. Approximately \$350,000 has been spent on the development and equipment.

2,940,000 Tons in Sight.

"In a report dated March 1, Mr. Bacon estimates to me that the ore in sight above the 700-foot level is 2,940,000 tons, containing more than 2 per cent. copper and \$1.25 a ton in gold and silver. As the ore has a magnetite base and is consequently self-fluxing, Mr. Bacon estimates the net profit, as soon as the property shall be adequately equipped, at \$2.60 a ton. This is on a basis of 18 cents a pound for copper. These figures show an estimated net ore reserve of \$7,644,000 above the 700-foot level on March 1, or a trifle more than \$38 a share.

"Mr. Bacon says development has been confined to the main vein and proceeded on only half its length within the property. He says there has been no diminution of ore bodies or value with increased depth, so there is basis for an expectation of an ultimate return much in excess of the foregoing estimate."

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange, April 9, 1918:

Gold.		Bid.	Asked.
Apex . . . . .	.04 1/4	.04 1/2	
Boston Creek . . . . .	.12	..	
Dome Extension . . . . .	.10	.11	
Dome Lake . . . . .	..	.22	
Dome Mines	8.40	8.50	
Imperial . . . . .	.01	.01 1/2	
McIntyre	1.34	1.35	
Hollinger	5.10	5.15	
New Ray . . . . .	.19 1/2	.20	
Porcupine Crown . . . . .	.14	.15	
Vipond . . . . .	.18	.21	
Preston East Dome . . . . .	.03	.03 1/2	
Teck-Hughes . . . . .	.51	.55	
West Dome . . . . .	.13 1/4	.14	
Silver.		Bid.	Asked.
Adanac . . . . .	.08	.10	
Bailey . . . . .	.03	.04 1/2	
Beaver . . . . .	.27	.27 1/2	
Ferland . . . . .	.09 1/2	.12	
Coniagas	3.10	3.20	
Crown Reserve18	.21	
Gifford02 1/4	.02 3/4	
Great Northern03	.04	
Hargraves07	.07 3/4	

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 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 17 cents per lb.

April 9, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10¼ cents per lb.
 Lead, 9¼ cents per lb.
 Antimony, 16 cents per lb.
 Copper, casting, 29 cents per lb.
 Electrolytic, 29½ cents per lb.
 Ingot brass, yellow, 20 cents; red, 26 cents per lb.

April 9, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.
 Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York	London
	cents.	pence.
March—		
25.	92¾	46
26.	92¾	45½
27.	92¾	45½
28.	92¾	45½
April—		
1.	92¾	45½
2.	92¾	45½
3.	92¾	45½
4.	91¾	45½
5.	91¾	45½
8.	91¾	45¼
9.	91¾	45¼
10.	91¾	45¼
11.	93¾	46¼

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Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

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Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

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Lead, outside, nominal, 7.25.

Spelter, prompt western shipment, 7.07½ to 7.17½.

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Powdered aluminum, 65.00 to 70.00.

Metallic Magnesium—99% plus \$2.00 to 2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$125.00.

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10 per cent. Iridium, \$113.00.

Cobalt (metallic), 2.50 to 3.50.

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Sheet copper—Base prices.

Hot rolled, 31.50 to 33.00.

Cold rolled, 32.50 to 34.00.

Copper bottoms, 39.50 to 41.00.

(Shipments from stock 2c per lb. extra).

Copper rods—Base prices.

Round, 32.50.

Sq. and rectangular, 33.50.

Copper wire—Base prices.

Nominal, 26.25—26.75.

Brass Products—Base prices.**High brass—**

Sheets and wire, 26.75 to 27.50.

Rods, 24.75—26.75.

Low brass—

Sheets and wire, 30.00 to 32.00.

Rods, 30.75 to 32.75.

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Brass, 34.75 to 36.75.

Bronze, 39.75 to 41.75.

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Brass, 35.50 to 37.50.

Copper, 38.00 to 40.00.

Bronze, 42.50 to 43.50.

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Cut lead sheets, 9.50.

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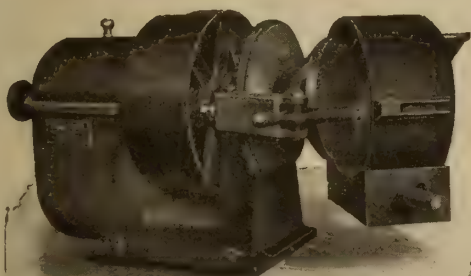


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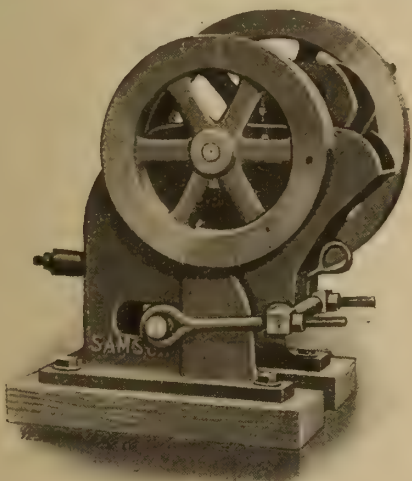
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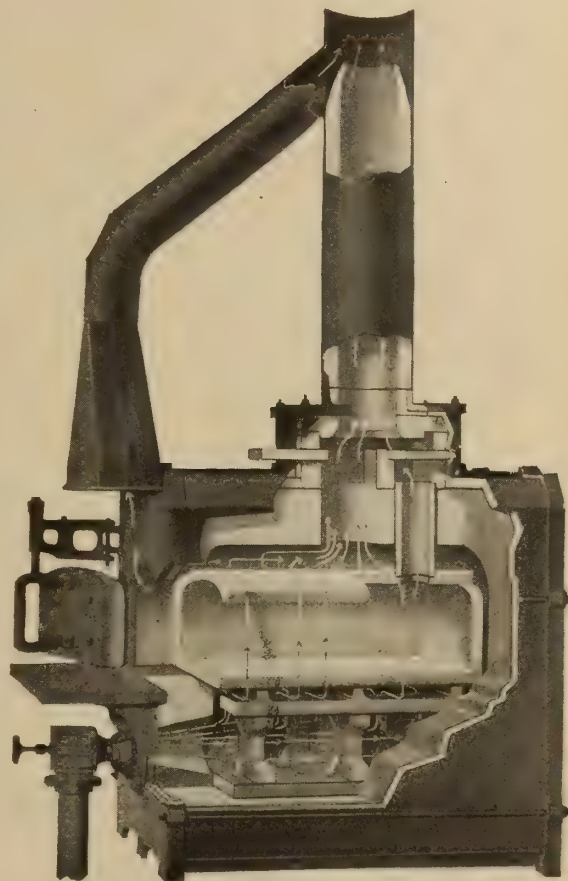
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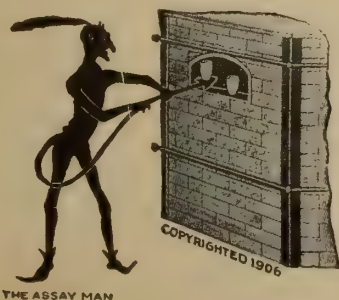
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- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

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Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that *"invention resides not alone in the critical proportion of oil, but also in air and agitation,"* and again, *"in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,"* and further, that the Supreme Court did not limit the patent to *"agitation by mechanical means,"* but to agitation of a violent and persistent kind; *"it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth."*

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a *"critical"* proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: *"Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation."*

The Court further confirms this important dictum by saying: *"If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement."*

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

(Signed) J. M. Callow.



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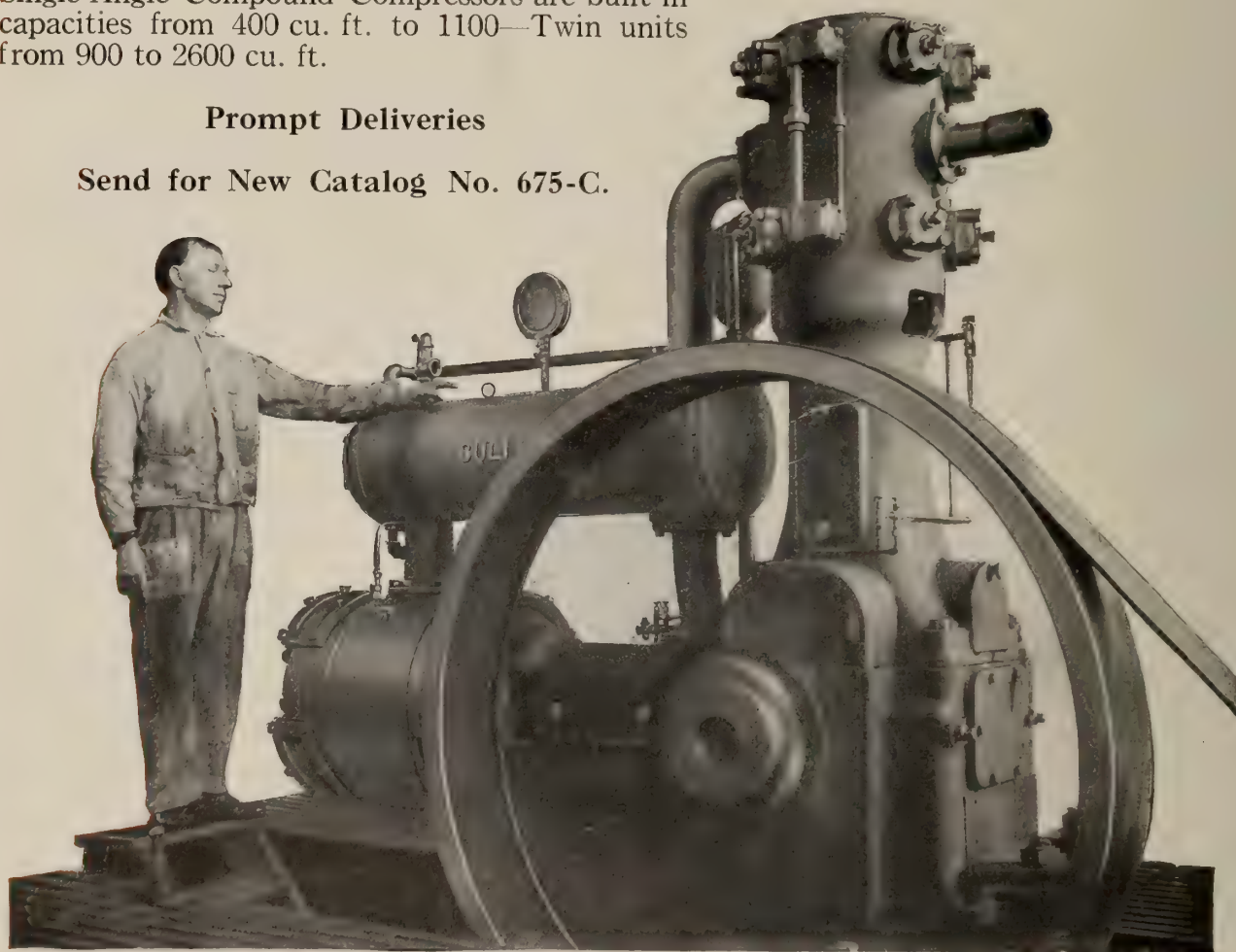
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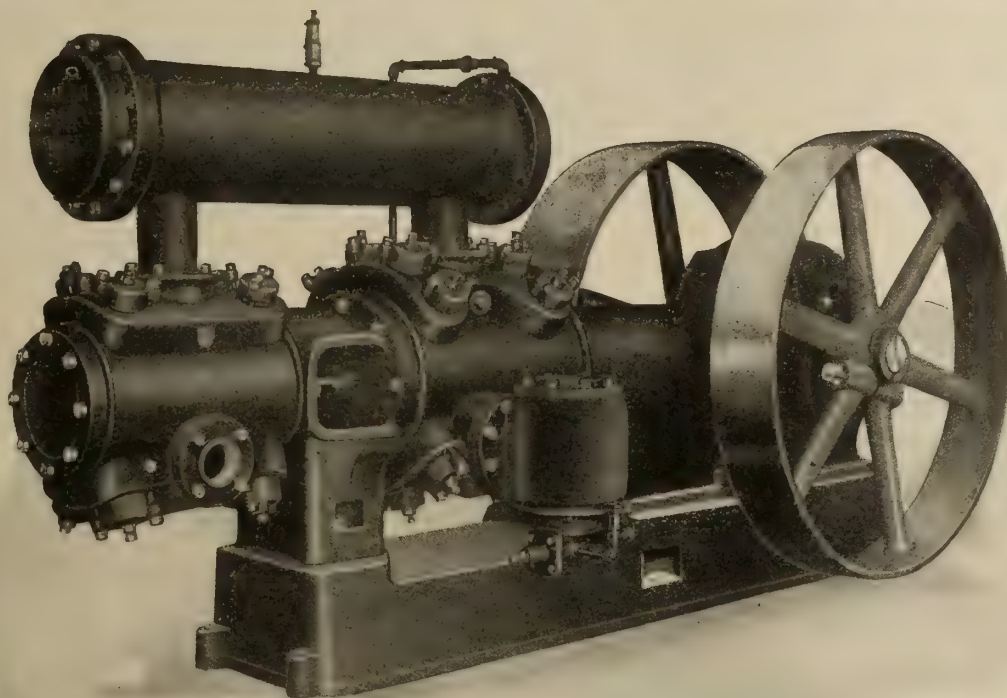


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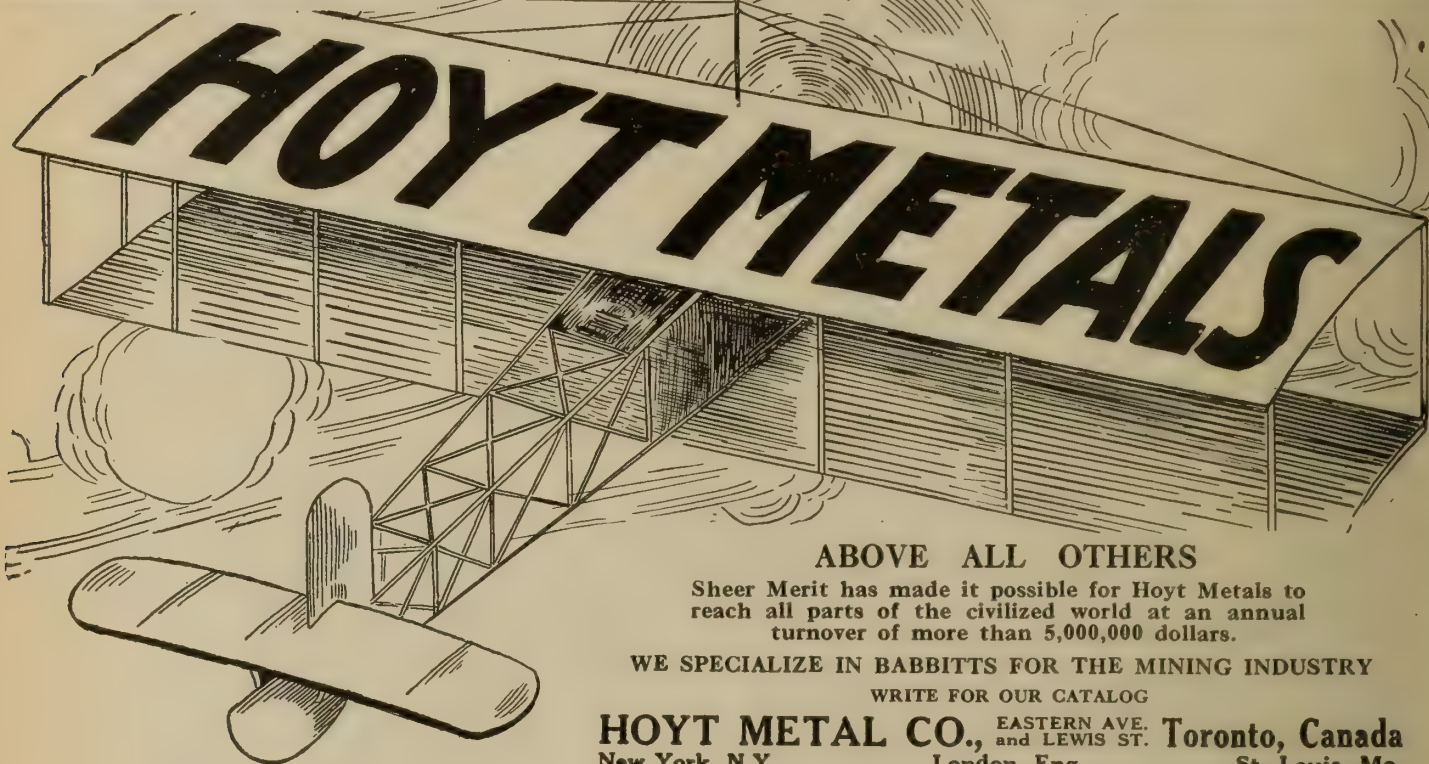
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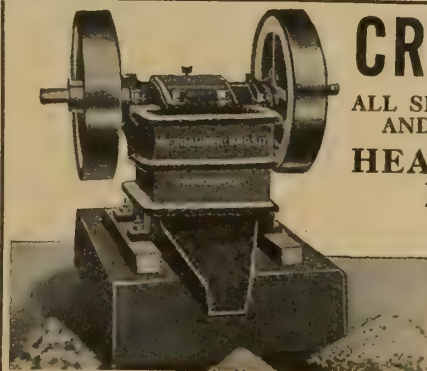
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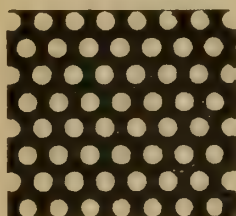
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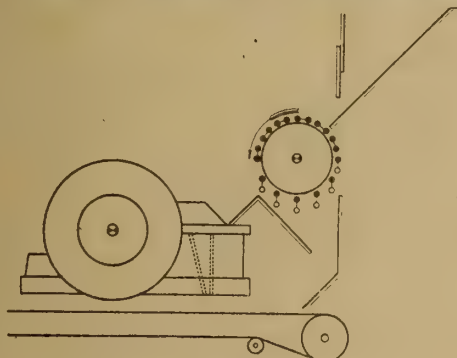
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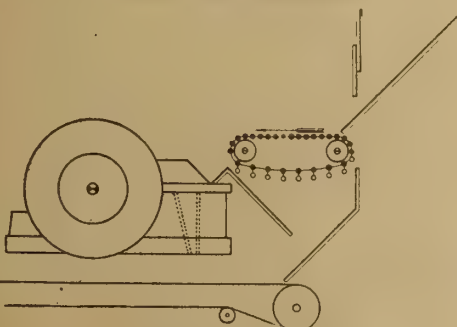
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Department of Colonization, Mines and Fisheries

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MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

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WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

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MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,510; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

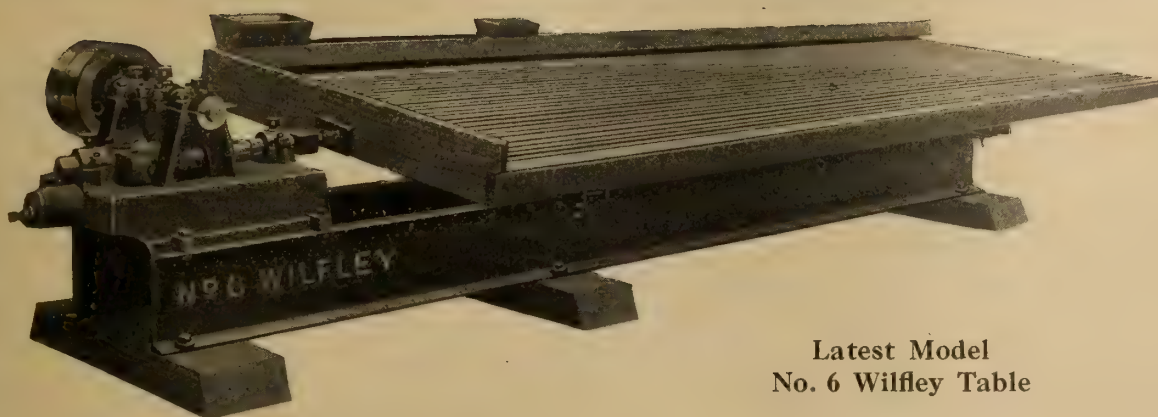
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, May 1st, 1918.

No. 9

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the
MINES PUBLISHING CO., LIMITED

Head Office 263-5 Adelaide Street, West, Toronto
Branch Office 600 Read Bldg., Montreal

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CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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Mr. John T. Stirling, Chief Inspector of Mines, of Alberta, says: "If all fuel consumed in the Provinces of Alberta, Saskatchewan and Manitoba was supplied from Albertan mines, as it should be, the output would be nearly doubled." The Alberta operators are ready to show that Mr. Stirling is correct. They need only the assurance that there will be a market for the coal mined.

The cutting down of imports of American coal into the Prairie Provinces would be a hardship if it were done unexpectedly. If, however, an announcement were made now as to the amount that will be available, Alberta operators could keep their mines in operation during the summer to make up the balance. Obviously it would be greatly to the advantage of both employers and employees if the Alberta mines had a large enough

FUEL AND POWER.

Fuel and power production and consumption are matters that Canadian mining and metallurgical companies are much interested in at all times. Naturally the present shortage has intensified the efforts to increase production and led to much discussion of ways and means. Among the probable results are: considerable increase in use of Canadian coal in the west; greater development of water powers; testing of peat possibilities in Ontario and briquetting of lignites in Saskatchewan. The much to be desired increase in production of coal in Nova Scotia seems far away, owing chiefly to labor shortage.

Coal mining is a big industry in Nova Scotia, Alberta and British Columbia. Power production is an important subsidiary enterprise of several metal mining and metallurgical companies. Power consumption is a failing common to all and so those companies not interested as producers are interested as consumers.

According to figures published by the Department of Mines, Canada produced 14,015,588 tons of marketable coal in 1917. We exported 1,733,156 tons and imported 20,857,460 tons.

Most of the coal imported is consumed in Central Canada, which has no coal but is close to the Pennsylvania fields. We should, and probably will later, use water power for many of the purposes for which this imported coal is put, but it would be difficult for Central Canada to get along with less coal for heating purposes than was imported last year.

In Western Canada there is an opportunity to at once cut down our imports somewhat by utilizing Western coal more extensively. Alberta mines could supply a much larger amount than they have been able to find a market for in Canada, owing to competition from imported coal and unfavorable freight rates.

The situation in the East is very discouraging. There we have plenty of coal and yet we find that the production is decreasing instead of increasing. Lack of transportation facilities long ago prevented the Nova Scotia companies from sending the normal supply to St. Lawrence ports. The labor shortage, due to the great numbers of miners enlisting, has made it impossible to obtain the desired output.

As has been pointed out many times, it would be easily possible to mine in Alberta sufficient coal to meet all the needs of Alberta, Manitoba and Saskatchewan, if it should prove impossible to import the customary amounts from the United States. Last year less than 5,000,000 tons was produced by Alberta mines that could produce about 8,000,000 tons. Owing to lack of market, it is at present impossible to keep the mines in operation continuously throughout the year, although they are sufficiently developed to make much larger

It may seem absurd that with good coal close at hand in Alberta, the people of Manitoba and Saskatchewan should be worrying about their next winter's supply. But they have cause for worry, for unless the Canadian operators are at once given assurance that American coal will not be available, they cannot undertake to keep the mines in operation during the summer months. If the usual 3,000,000 tons of American coal is imported this year, the Alberta operators will be able to dispose of only about 5,000,000 tons, and they can produce that amount in about 7 months. If, on the other hand, the operators are not immediately given assurance that 8,000,000 tons will be needed, they will have lost time that it will be impossible to make up. If imports fail, then there will be a shortage which will be more or less acute depending on the length of time lost now.

As a great deal has been said and written about methods of utilizing the lower grade coals of the West, there seems to be a rather general impression that Alberta mines cannot supply all the needs of the Prairie Provinces. It is true that a considerable portion of the coal mined in Alberta will not store and only a very small amount is anthracite.

But there is mined in Alberta, coal suitable for all industrial and domestic purposes. The statement, often made, that Alberta coal cannot be stored is, according to John T. Stirling, Chief Inspector of Mines, true only of less than one-third of the output. Mr. Stirling in a paper presented at the annual meeting of the Canadian Mining Institute in March, said: "It is being fully demonstrated every day that railway locomotives, steam plants and buildings of all kinds and sizes can use Alberta coal in Saskatchewan and Alberta with very satisfactory results, so that there appears to be no reason why the same fuel cannot be used in Manitoba."

TUBE MILL PEBBLES.

In the course of explorations in Nova Scotia last summer, Mr. A. O. Hayes, of the Geological Survey of Canada, collected samples from deposits of pebbles suitable for use in tube mills, which occur in beach deposits along the shore of Gabarus Bay, Cape Breton County. Along the north shore the pebbles are derived directly and in several coves in the vicinity of Eagle Head, from the volcanic rocks which form this rugged coast, beaches thrown up well above high tide are composed entirely of pebbles of rhyolite and similar types of rocks, several thousand tons of which could be readily loaded on vessels.

At the head of the bay, a barrier bar has been formed which contains a mixture of material, including the types mentioned above, together with granite, syenite, quartz-porphry and quartzite, derived from reworked glacial drift as well as the local volcanic rocks. Many thousand tons of this material could be sorted from this beach, and loaded on vessels by means of small boats, as the water is shallow in the vicinity of this bar.

A series of careful comparative tests were made in a Deval abrasion machine on samples of rhyolite pebbles, the mixed material, and of commercial flint pebbles. In regard to resistance to abrasion, all the samples proved superior to the commercial flint pebbles.

Louisburg, the terminal of the Sydney and Louisburg Railway, is about ten miles eastward from the head of Gabarus Bay, connected by a very rough wagon road; and Sydney, the terminal of the Canadian Government railway, is about twenty miles northward, with a better wagon road.

NAMES OF NEW GOLD TOWNSHIPS SOUTH OF LAKE ABITIBI.

During the autumn of 1917 gold was discovered in unsurveyed territory south of Lake Abitibi in north-eastern Ontario. This area lies about 70 miles almost directly east of the well known Porcupine area.

During the coming summer the Ontario Bureau of Mines is to make a geological survey of this new gold area. Following the custom of Ontario, this area is being divided into townships, 6 miles square. These townships have recently been given the following names in honor of men well known in the mining and geological world. In alphabetical order the names are as follows:

Frecheville—Prof. Wm. Frecheville, Professor of Mining in the Royal School of Mines, London; past President of the Institution of Mining and Metallurgy.

Garrison—Mr. F. Lynwood Garrison, Mining Engineer, Philadelphia, Pa.

Harker—Dr. Alfred Harker, F.R.S., immediate past President of the Geological Society of London.

Holloway—The late Mr. George T. Holloway, Chairman of the Royal Ontario Nickel Commission, 1915-17.

Lamplugh—Mr. G. W. Lamplugh, F.R.S., President of the Geological Society of London.

Marriott—Mr. Hugh F. Marriott, President of the Institution of Mining and Metallurgy, London.

Rand—Mr. Chas. F. Rand, past President of the American Institute of Mining Engineers, New York.

Stoughton—Dr. Bradley Stoughton, Secretary, American Institute of Mining Engineers, New York.

Mr. E. H. Hamilton, who for some time had been metallurgical manager for the Consolidated Mining and Smelting Company of Canada, at its smelting works and refineries at Trail, B.C., has left British Columbia, and is now with the United States Smelting Co. at Midvale, Utah.

Mr. J. B. Tyrrell has left for northern British Columbia, where he expects to spend a few weeks.

Major R. W. Brock is president of the Canadian Soldiers' College at Seaforth, Sussex, England. Major Davis is head of the Department of Engineering.

Mr. E. B. Schley, of New York City, has succeeded his father, the late Mr. Grant B. Schley, as president of the company operating the Britannia mines and concentrating plants near Britannia Beach, Vancouver mining division of Howe Sound, British Columbia.

Mr. Harold Grant is in charge of development work being done on some copper claims at Sooke, Victoria mining division of British Columbia, Vancouver Island. The property is being explored for the Ladysmith Smelting Corporation, under an option of purchase.

CORRESPONDENCE

High Grade Coals in Alberta.

Editor, Canadian Mining Journal:

Sir,—A letter, dated the 8th of February, 1918, from Kingston, Ont., having appeared in the March edition of the Canadian Mining Institute Bulletin, opens up a very important subject not indicated by the title. The writer, Mr. J. C. Gwillim, says, "We are inclined, now-a-days, to resent the alienation or private control of some of our natural resources. Yet we are, or were, least concerned about the two most vital ones, food and fuel. . . . It is left to the coal miners alone to produce enough fuel. . . . Soon we may expect to receive little or no hard coal from Pennsylvania; it is being exhausted and will be conserved by the American people."

The total coal output of Canada last year was about fourteen million tons, and our import of coal from the United States about seventeen million tons, of which four million tons was anthracite or hard coal, and the balance bituminous.

Mr. Gwillim asks where should we be if the United States stopped the exportation of coal to Canada? The present writer has recently as well as previously suggested, that very unpleasant things might happen in Canada if a serious strike occurred on the railways or at the collieries in the United States.

The above three possibilities would all be equally serious and therefore the sooner we people on the Canadian side of the line face the music the sooner will common sense place us in an independent position. We must, however, give the United States and its fuel controller our grateful thanks for the brotherly way in which this problem was dealt with during the past winter.

Western Canada possesses the most magnificent coal-fields, filled with seams of all qualities and which are in thickness also unequalled anywhere else on this earth.

Mr. John Stirling, the Chief Inspector of Mines for Alberta, in reference to the possible output of the Province of Alberta, tells us that the possible output might have been over eight million tons, whereas, it only amounted to about 4,863,414 in 1917, or 214,810 tons in excess of 1916.

A recently issued estimate of the coal resources of Canada made by Mr. White, of the Dominion Conservation Board, gave the Province of Saskatchewan credit for a store of over sixty-six billion tons of lignite. Experiments having been made by the Dominion Government, in conjunction with the Advisory Council of Scientific and Industrial Research it has been stated that they will erect a works to treat this and other lignite deposits, and convert them into coked or cindered coal, after extracting the by-products, and will finally convert them into briquettes equal to anthracite. This scheme if it works out successfully, may to some extent relieve the situation in that part of the Dominion.

Mr. White does not credit Alberta with the possession of any stores of anthracite, but he does credit that Province with 846 million tons of semi-anthracite, and 932 billion tons of sub-bituminous. As no details of these estimates are given, it is impossible to question his figures in detail. We will be satisfied for the moment to find that he credits the Province with some semi-anthracite, which for general purposes is a much more useful quality of coal than anthracite.

Now for a few facts, there are between Bankhead and to at least as far as the divide between the Kananaskis and Elk valleys, several coalfields containing the

most magnificent deposits of coal to be seen anywhere, and the writer has in mind one of these where it is probable that twelve and a half per cent. of the whole mountain is coal.

We are fortunate to have one man out here in the woolly west, W. P. Burns, of Calgary, who, recognizing the value of this vast wealth of coal, will without delay demonstrate that Alberta can supply a huge tonnage of very high grade anthracitic coal. Before the summer comes, Mr. Burns' mining staff will be at work, and his railway engineers will be as busy as bees laying a full gauge railway track from Okotoks to the Sheep Creek coal mines, a distance of about 55 miles.

To make sure that the following details of this property are correct, they have been submitted to Mr. Alexander Sharp, Mr. Burns' mining engineer.

The property is in a synclinal basin form, and is of Cretaceous age. To those who do not know its exact location it may be stated that it lies to the south-east of Mt. Rae, and to the east of the Misty range of mountains. Here Mr. Burns owns 12,000 acres of Crown granted land and minerals extending over a distance of eleven miles. Practically the whole of this area is coal bearing and at least a dozen workable coal seams have been prospected, which are all of workable size and quality.

The property lies at an elevation of over 5,000 feet above sea level, and therefore the coal will have a down grade to its markets.

A large number of analyses have been made, but the following will be sufficient to convince the sceptical that there are high class seams of anthracitic and bituminous coals in this field:

Number.	Moisture.	Volatile Combustible.	Fixed Carbon.	Ash.
4	1.00	12.5	82.00	3.5
5	1.00	12.50	82.00	3.50
7	1.00	11.10	81.10	6.00
14	1.82	11.74	82.25	4.20
17	1.20	15.30	75.25	7.25
16	2.00	25.00	70.00	3.00

No. 5 sample gave a very high result in British Thermal Units, viz., 14,877, one pound of it evaporating 15.4 lb. of water. Its high class quality will be better realized by comparing it with other anthracite coals, thus:

South Wales anthracite	14,884 B. T. Units
Burns anthracite	14,877 B. T. Units
Banff anthracite	14,000 B. T. Units
Pennsylvania anthracite	13,999 B. T. Units

If we adopt the classification of Mr. Dana, a well-known authority on coal, a good anthracite should contain from 78 to 88 per cent. of fixed carbon and, therefore, the first four analyses would show them to be anthracitic. Mr. D. B. Dowling's—President of the Canadian Mining Institute—is probably the best known of any of those used for the classification of coals, viz.:

Fixed Carbon + $\frac{1}{2}$ the Volatile Combustible

Moisture + $\frac{1}{2}$ the Volatile Combustible

and under this rule 15 and upwards ranks as anthracite, 13-15 as semi-anthracite, 3.5 to 6 as bituminous, and a higher class bituminous as 6 to 10. No. 16 in the above table gave a yield of 73% of coke, which in its turn gave a fixed carbon content of 94.9%.

How many hundreds of millions of tons of similar coals are to be found in this part of Alberta between the Elk divide and Bankhead it is at present impossible to say, but only railway communication and cheap freight rates are required to open it up to supply all the needs of the prairie provinces.

Although the writer has taken Mr. Gwillim's letter as his text, he does not propose to discuss costs in the way Mr. Gwillim has done; but the latter may find some comfort in the fact that the cost of working the coalfield in question is not likely to be excessive. The writer entirely agrees with Mr. Gwillim in the suggestion that the getting of coal is capable of much improvement in methods of working, which are often very wasteful.

Yours, etc.,

JAMES ASHWORTH.

Vancouver, April 11th, 1918.

LORD HYLTON MAKES STATEMENT CONCERNING MINERALS SEPARATION CORPORATIONS.

The Times, London, on March 14, printed the following account of a question and reply in the House of Lords concerning the Minerals Separation Corporations:

Lord Sydenham asked two questions concerning a German firm: (1) Whether the American branch of Messrs. Beer, Sondheimer and Co., of Frankfort, was blacklisted and subsequently released; and (2) what conditions were imposed when this branch of the German firm was permitted to act for a time as agents of Minerals Separation American Syndicate.

Lord Hylton, who replied, said the information which the Government had was to the effect that Messrs. Beer, Sondheimer and Co., of New York, were included in the statutory list, generally called, he thought, the black list in the United States, in July, 1916, and remained on that list until it was withdrawn on the entry of the United States into the war. It is perfectly true the Minerals Separation American Syndicate (1913) (Limited), which is a British registered company, entered into an agreement in the month of September, 1913, with Messrs. Beer, Sondheimer and Co., under which the firm were appointed the sole agents of the syndicate for the transaction of all commercial affairs of the Syndicate in the United States of America, Canada, Mexico, Cuba, and the Philippine Islands. Messrs. Beer, Sondheimer and Co. have their principal office at Frankfort, and have a branch in America carried on by Messrs. Benno Elkan and Otto Frohnknecht, who were resident and domiciled in New York City. In October, 1914, the syndicate applied to the Committee on Trading with the Enemy for leave to enter into an agreement with Benno Elkan and Otto Frohnknecht, under which the syndicate appointed them as the American branch of Beer, Sondheimer and Co., its sole and exclusive agents for the transaction of the commercial affairs of the syndicate in the places already mentioned, and Elkan and Frohnknecht undertook not to pay or to cause to be paid any money, etc., arising from or in connection with their trade relationship with the syndicate to Beer, Sondheimer and Co., of Frankfort, or any person resident in Germany or Austria, or to anyone for the use of such person during the war, and to defer until after the war any commission or remuneration payable to them. At that time Beer, Sondheimer and Co., of New York, were not blacklisted, and no authority was required by the syndicate to enable

them to enter into the proposed contract. They were informed by the Committee that there was no objection to their doing so.

In June, 1916, the syndicate approached the Treasury again. In view of their difficulties in America they had been advised to form an American Corporation to acquire from the syndicate the United States Patents and the Patents for Canada, Mexico, etc., and all their assets and other rights, but they were prejudiced by the Agency Agreement entered into with Benno Elkan and Otto Frohnknecht, the American Corporation which was proposed being unwilling to submit to the obligation to deal with them. The syndicate, therefore, proposed to invite Elkan and Frohnknecht to cancel the agreement in return for a certain number of fully-paid shares in the company and an option to subscribe at par for further shares. The shares in question were ultimately to be converted into shares in the American Corporation, and no benefit was to accrue in respect of them for five years. The substitution of a moderate shareholding interest in the company—£17,500 out of £200,000—appeared to be preferable to the control resulting from the exclusive agency under the Agreement of 1914, and, after reference to the Board of Trade, the Syndicate's proposal was sanctioned, subject, of course, to the approval of the Capital Issues Committee of the issue of shares if a new issue was involved. Meanwhile, the syndicate received from America the agreement entered into there for the formation of an American Corporation for the acquisition of its undertaking and assets, as finally settled. This agreement necessitated a modification of the proposed agreement with Elkan and Frohnknecht, putting an end to their exclusive agency. The shares which they were to receive as consideration for cancellation were to be placed at their disposal at the end of the war instead of at the end of five years, and Elkan and Frohnknecht were to be the general agents in the countries which I have mentioned, although not the exclusive agents, of the American company. On the other hand, they released to the British company the money to which they were entitled in respect of commission, which was stated to amount to from £16,000 to £20,000. The company stated that it was absolutely essential to continue this provision as to the agency, Elkan and Frohnknecht absolutely refusing to assent to its cancellation, and they pointed out that a leading American counsel had advised, in America, that the American branch of Beer, Sondheimer and Co. had no authority to enter into the new agreement or give the guarantee as to no-enemy benefit, and that the original agency agreement of 1913 was still in existence and could be enforced against the syndicate in the American Courts. Meanwhile the name of Beer, Sondheimer and Company of New York had been added to the statutory list. In all the circumstances the Treasury came to the conclusion that it was advisable in the national interest to authorize the company to enter into the agreement of August 4, 1916, with Elkan and Frohnknecht, even though their right to be appointed agents remained, rather than to leave the company under their liability of the 1913 and 1914 agreements to employ them as sole and exclusive agents, and sanction was accordingly given, so far as the Acts and Proclamations relating to Trading with the Enemy were concerned. The Capital Issues Committee subsequently recommended the issue of fresh shares, out of which inter alia the shares to which Elkan and Frohnknecht were entitled, were allotted to them.

By J. B. Challies.

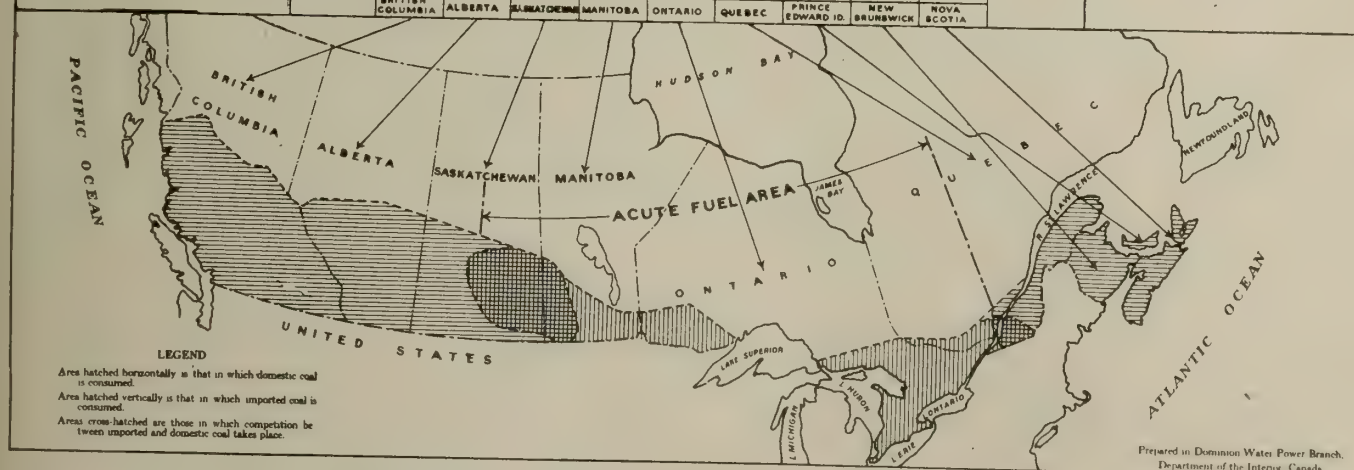
At first "blush" it might appear that water power has only an indirect and limited connection with the recent critical fuel shortage, which through suspended effort has caused temporary industrial stagnation and local domestic hardships of enormous extent and involving great financial loss. Even a casual general survey of our fuel-power requirements, however, will indicate that not only has water power a very direct and important bearing on the present situation, but that water power must, in the future, take a very much greater share in our fuel-power burdens.

I propose to show: First—That water power must take a very prominent part, if the best use of the varied fuel-power resources of Canada is to be achieved, and Second—That there must be evolved a national master fuel-power policy which will realize the best possible co-ordinated and concomitant development and use of all the fuel-power resources of the Dominion.

Plate No. 1 represents the coal consumption and production in Canada. The tabulated statement on the top of the plate summarizes the consumption in the various provinces of the different classes of coals, both domestic and imported. The greatest consumption is in central Canada, including the provinces of Manitoba, Ontario and Quebec. Coal production is greatest in the extreme western and eastern provinces. British Columbia and Alberta on the one hand and Nova Scotia

COAL CONSUMPTION AND PRODUCTION IN CANADA.												
SOURCES OF DATA	CONSUMPTION	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	PRINCE EDWARD IS.	NEW BRUNSWICK	NOVA SCOTIA	GRAND TOTALS	REMARKS
	Domestic											
This data obtained from:	Anthracite	10,542	113,130	26,917	1,654	—	—	—	—	—	—	
Alberta. Dept. of Public Works. Annual Report, 1916.	Bituminous	1,311,433	1,081,633	140,413	17,719	—	89,944	8,292	891,031	2,826,300	—	This compilation is based on 1916 figures. Consumption areas become somewhat distorted because 8,000,000 tons, or about 8% of the consumption in railway coal, and as such is carried from provinces to provinces as traffic necessitates.
Alberta. Dept. of Mines. Quarterly Bulletin, 1917.	Lignite	21,443	959,322	13,434	79,252	—	—	—	—	—	—	
British Columbia. Bureau of Mines. Annual Report, 1916.	Total Domestic	1,343,120	2,074,485	1,302,958	98,629	—	89,944	8,292	891,031	2,826,300	10,701,530	Tonnages. (1) Are from mines and other reports of provinces concerned. (2) Are from combinations of reports of provinces concerned.
Canada. Dept. of Mines, Mines Branch. Production of Coal & Coke in Canada, 1916.	Imported											
	Anthracite	—	Small	208,000	325,000	2,242,850	1,704,410	—	Small	Small	—	(3) Are calculated, allocating the tonnage according to population and known consumption both imported and domestic.
Canada. Dept. of Customs. Annual Report, 1915-16.	Bituminous	—	Small	718,879	1,627,998	6,459,105	4,174,850	—	—	—	—	deductions and additions being made accordingly for domestic and imported tonnages in order to arrive at a reasonable figure.
New Brunswick. Crown Land Dept. Annual Report, 1915-16.	Total Imported	—	Small	926,879	1,952,998	8,701,979	5,879,260	—	Small	Small	17,580,603	These figures must be obtained direct from any Government report.
Nova Scotia. Dept. of Public Works. Annual Report of the Mines, 1915-16.	Total Consumption	1,343,120	3,024,485	2,229,835	2,051,627	8,701,979	6,964,204	8,292	891,031	2,826,300	28,282,133	Differences in totals are accounted for partly by taking arbitrary figures in some cases for purposes of calculation and by different methods of tabulation and statistics.
U.S. Geological Survey. The Coal Fields of the United States, 1917. (Professional Paper 100-A).	Total Production	2,580,261	4,559,054	281,300	—	—	—	—	143,540	6,812,140	14,460,095	
U.S. Geological Survey. Coal in 1915 (Part A: Production). (Part B: Distribution and Consumption) 1916.	Production over consumption	1,240,041	1,534,565	—	—	—	—	—	—	—	4,065,840	
	Consumption over production	—	—	1,948,535	—	—	—	—	747,491	—	—	
	Consumption no production	—	—	—	2,051,627	8,701,979	6,964,204	8,292	—	—	—	
		BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	PRINCE EDWARD IS.	NEW BRUNSWICK	NOVA SCOTIA		

NOTE: Basic data compiled and tabulated by J. F. S. Brown, Mining Engineer.



Development along independent and divergent lines has, in the past, prevented adequate correlation of the great Canadian industries of fuel production and hydro-power supply. There is now, however, as a result of the fuel shortage, a consensus of opinion among men familiar with fuel and hydro-power matters in Canada, that there is between these allied industries enormous scope for national co-operation which would be conducive to their mutual advantage, as well as to the common weal.

on the other not only meet their own coal requirements, but produce a very considerable overplus for consumption in the contiguous portions of Central Canada. The central provinces, Manitoba, Ontario and Quebec, are almost wholly dependent on outside sources, mainly imported coals. This is clearly shown by the hatched areas on the map, the horizontal hatching covering the areas which produce their own needs, the vertical hatching covering the areas which are dependent. Where there is cross-hatching both Canadian and imported

*Extracts from a paper presented at the First General Professional Meeting of the Canadian Society of Civil Engineers for the discussion of the Present Fuel and Power Situation, Toronto March 26-27, 1918.

coals are consumed. It is to be observed that Central Canada, where consumption is greatest, is non-productive. This I have termed the "acute fuel area" of Canada.

Canada Imports Coal and Exports Coal and Electric Energy.

This "acute fuel area" is now dependent for domestic requirements mainly upon Pennsylvania anthracite and for industrial needs upon American bituminous coals, as well as upon Canadian water power. So far as domestic heating requirements are concerned, Mr. Dick, the Consulting Mining Engineer of the Conservative Commission, in his paper on the "Rational Development of Canadian Coal Resources" has pointed out the possibilities of the Western portion of the "acute fuel area" being furnished with briquetted lignite from the prairie provinces. Mr. Stansfield of the Dominion Mines Branch, in his paper on "The Low Temperature Carbonization and Briquetting of Bituminous Coal," has pointed out the possibilities of meeting the domestic heating requirements of the Eastern portion of the "acute fuel area" by the product from the low temperature carbonization of Nova Scotia bituminous coals. Although both these processes are proven to be practicable, they are as yet in their formative or agitational stage and some considerable time must elapse before

they can be placed on a commercial basis to furnish sufficient fuel to substitute for any large portion of the Pennsylvania anthracite now imported for domestic heating. There is at the present time no available supply, even in small quantities, of a Canadian coal fuel to take the place of imported anthracite. Nevertheless, this "acute fuel area" can eventually be made independent of foreign fuel imports and Canada can become self-sustaining, at any rate, in respect of her domestic heating requirements. There must, as a necessary preliminary, be a national, co-ordinated development and use of all the available fuel and power producing agencies in the Dominion. Such a co-ordination must be a matter of gradual evolution and adoption, and will, to a great extent hinge on whether Canada can reasonably expect assured fuel imports from the United States for a considerable period in the future.

As we are now exporting large quantities of coals from British Columbia and Nova Scotia into adjacent States of the Union and as we are also exporting about 275,000 horse power of electric energy, equal in value to about 3,000,000 tons of coal, it is obvious the United States cannot afford to place a sudden and complete embargo on coal exportation to Canada. The two countries must deal with each other, at least, upon a basis of quid pro quo. Providing Canada has her own fuel resources under strict national control, this power exportation should assure her an importation of sufficient coal to tide over any readjustment period necessary to permit of an ultimate dependence on Canadian sources of fuel and power.

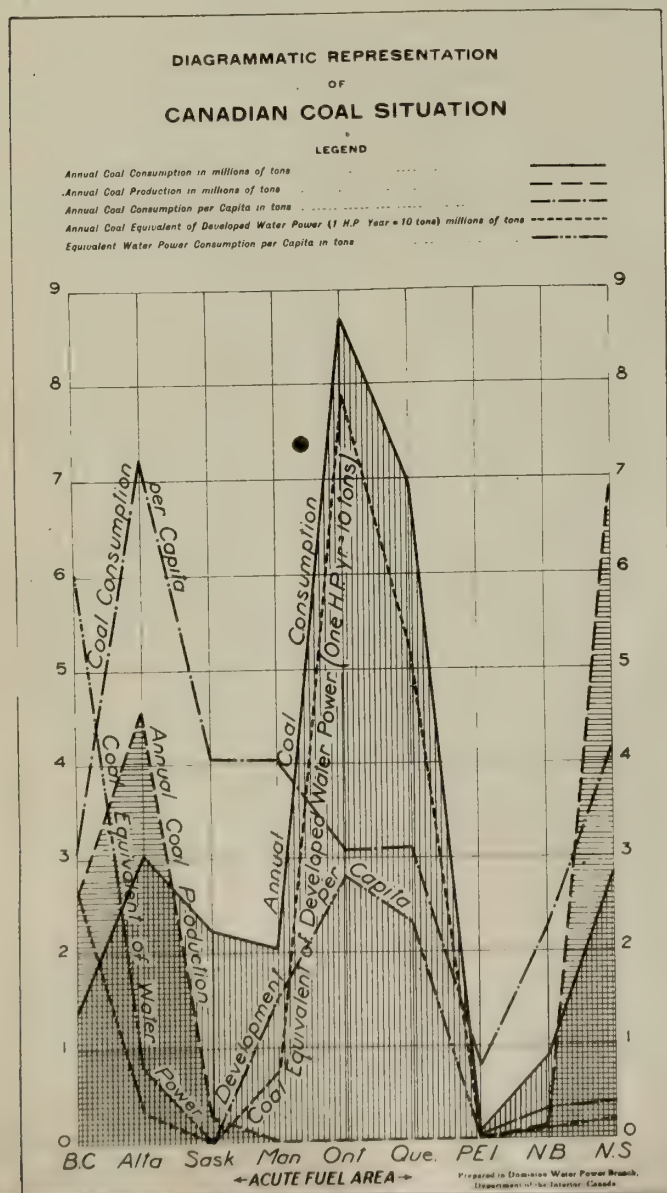
The exportation in the past of Canadian electric energy has not been without compensating advantages. An assured United States market for Canadian power loads has enabled the financing and completion of several hydro-electric projects, the construction of which, so far as domestic markets alone are concerned, would not have been warranted at the time. The initial United States power load has, therefore, made it possible for the domestic market to reap all the benefits of available hydro-electric energy many years sooner than otherwise would have been possible.

While Canada has been receiving far more value in her coal importation than she has given in her power exportation the advantage is rapidly disappearing. It is reasonable to expect that the tendency will be for hydro-power exportation to increase and for coal importation to decrease. The time may come, and in the near future, when the balance will be against Canada.

It is, therefore, imperative that every proposal for increase in the exportation of power be carefully considered from a broad, national standpoint. Such consideration involves the evolution of a formula with regard to power exportations which will have cognizance of Canada's fuel-power needs generally.

We must face the fact that for some time to come we shall require to import United States coal, and that in turn therefor we can, under proper conditions of recovery safely and profitably export some of our surplus hydro-electric energy.

Mr. B. F. Haanel, Chief of the Fuel Testing Division, Department of Mines, in his clear and comprehensive paper on the "Fuels of Canada," describes the nature, location and extent of our varied, available fuel resources. Mr. Haanel affirms that, while the problems associated with the distribution of fuel to the various parts of Canada are exceedingly complex and the strictest conservation must be practised, the Dominion is endowed with fuel deposits on such a magnificent



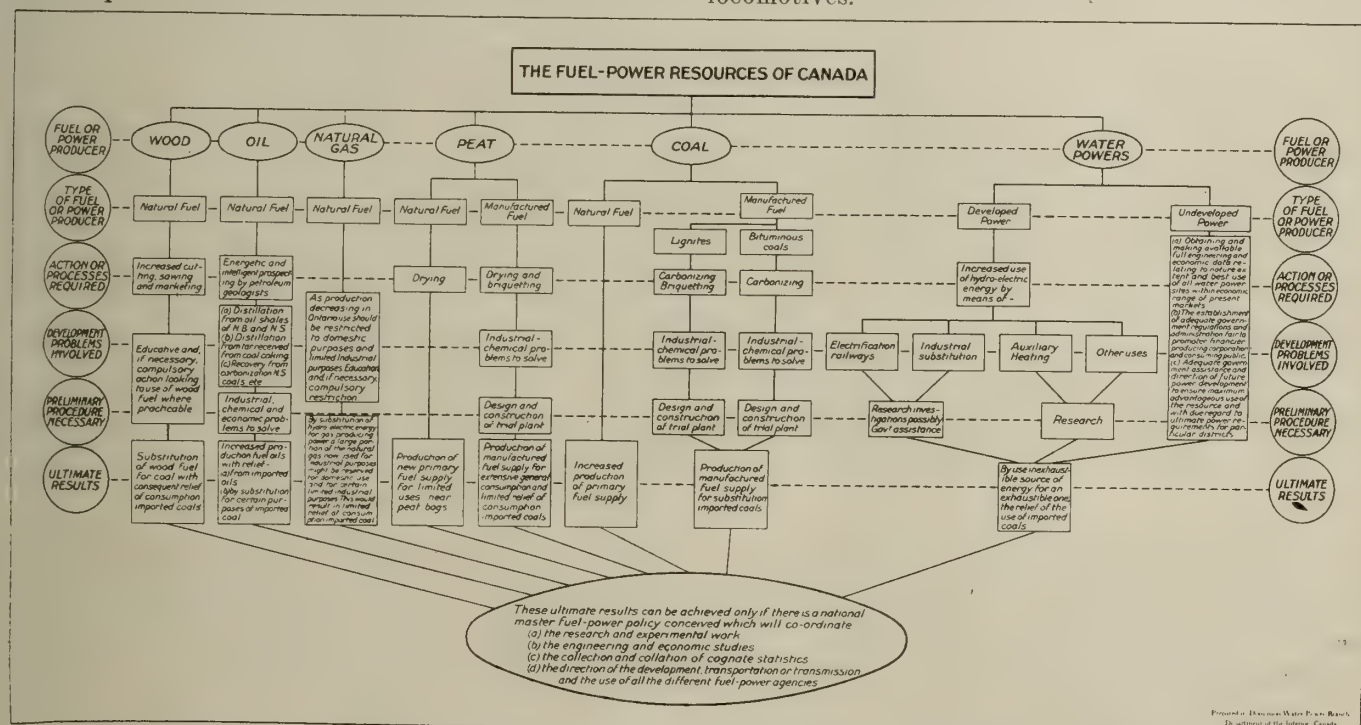
scale that all that is necessary is their proper exploitation and economic use for the country to be eventually practically independent of foreign sources of fuel. Mr. Haanel is particularly emphatic that Canada need not go abroad for fuel for household use, if her own fuel resources are properly exploited.

The problem of Canada's fuel needs outside of the "acute fuel area" offers little difficulty, owing to an abundance of both coal and water power. It is simply a matter of efficient and effective use of available resources. Within the "acute fuel area," however, the problem is pressing and prodigious. It resolves itself into two parts, first, provision for domestic or household heating consumption; second, provision for industrial requirements.

less, be seriously considered. Water power will be the main means of such substitution. The industrial fuel problem, therefore, in the "acute fuel area" becomes largely a matter of substitution of hydro power for fuel power.

Electrification of railways—especially terminals with adjacent engine divisions—would save enormous consumption of bituminous coal and relieve our transportation systems of their greatest burden.

It is estimated that something like 9,000,000 tons of coal was consumed by our railroads in the year 1917. Judging from the results obtained from the electrical operation of railroads in the United States, it would be possible to save at least two-thirds of this coal if electric locomotives were substituted for the present steam locomotives.



Substitutes for Anthracite for Domestic Needs.

The requirements for fuel for general household use are, at the present time, furnished by American anthracite; over 4,000,000 tons were used in 1916. Competent experts declare the anthracite coal fields of the United States are in measurable distance of exhaustion and that the supply will not last a hundred years. Having in mind the ever-increasing demands within their own borders for this fuel and the rapid decrease in quality as the supply becomes exhausted, responsible fuel advisers of the United States Government have seriously urged the establishment of an embargo against exportation of anthracite. We in Canada must realize that our supply of this fuel may be gradually restricted. It is, therefore, essential that we, without delay, consider what can be accomplished in the production of a suitable substitute for United States anthracite.

Substitution of Hydro Power for Coal.

The industrial requirements are now met by Canadian hydro power and United States bituminous coal. About 14,000,000 tons were consumed in 1916 for this purpose in the "acute fuel area."

Owing to the large reserves of bituminous coal in Pennsylvania, this class of fuel will probably be available to the "acute fuel area" of Canada for many years. Although not immediately necessary, the ultimate substitution of bituminous coals must nevertheless

This would be a saving of 6,000,000 tons of coal in one year, and would require about 900,000 water horse power.

Electrification of steam roads at this juncture is not advocated. Under normal conditions, however, and in certain districts, as in western Ontario, electrification will become an economic necessity in a few years.

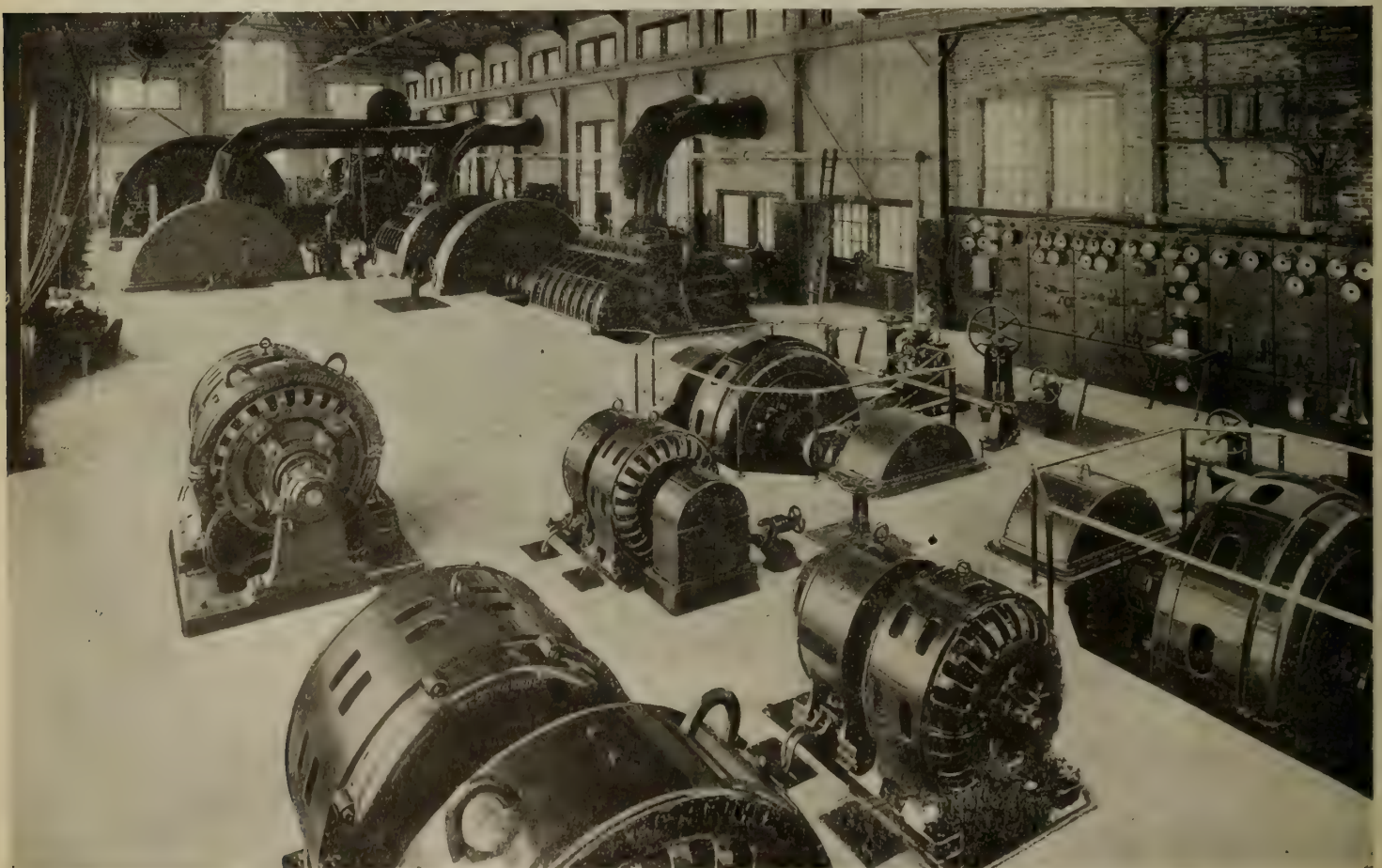
In districts that cannot be served by water power, the location of modern, efficient, super-power stations at strategic points, with a resultant elimination, or combination, of many inefficient small stations, would cause a very large saving in the consumption of soft coal, with a concurrent increased production of power.

The substitution in industry generally of hydro power for steam fuel power, would also result in a tremendous relief. There are many plants where such an exchange would be possible now. Future manufacturing plants should be encouraged to locate where hydro power is available.

The relation between developed water power and the coal production and consumption in the various provinces is represented on Plate 2. It is interesting to note that in the "acute fuel area" there is about as much water power developed, so far as coal value is concerned, as there is coal consumed. It is portentous that the bulk of our water power production at the present time is within the "acute fuel area," and it is



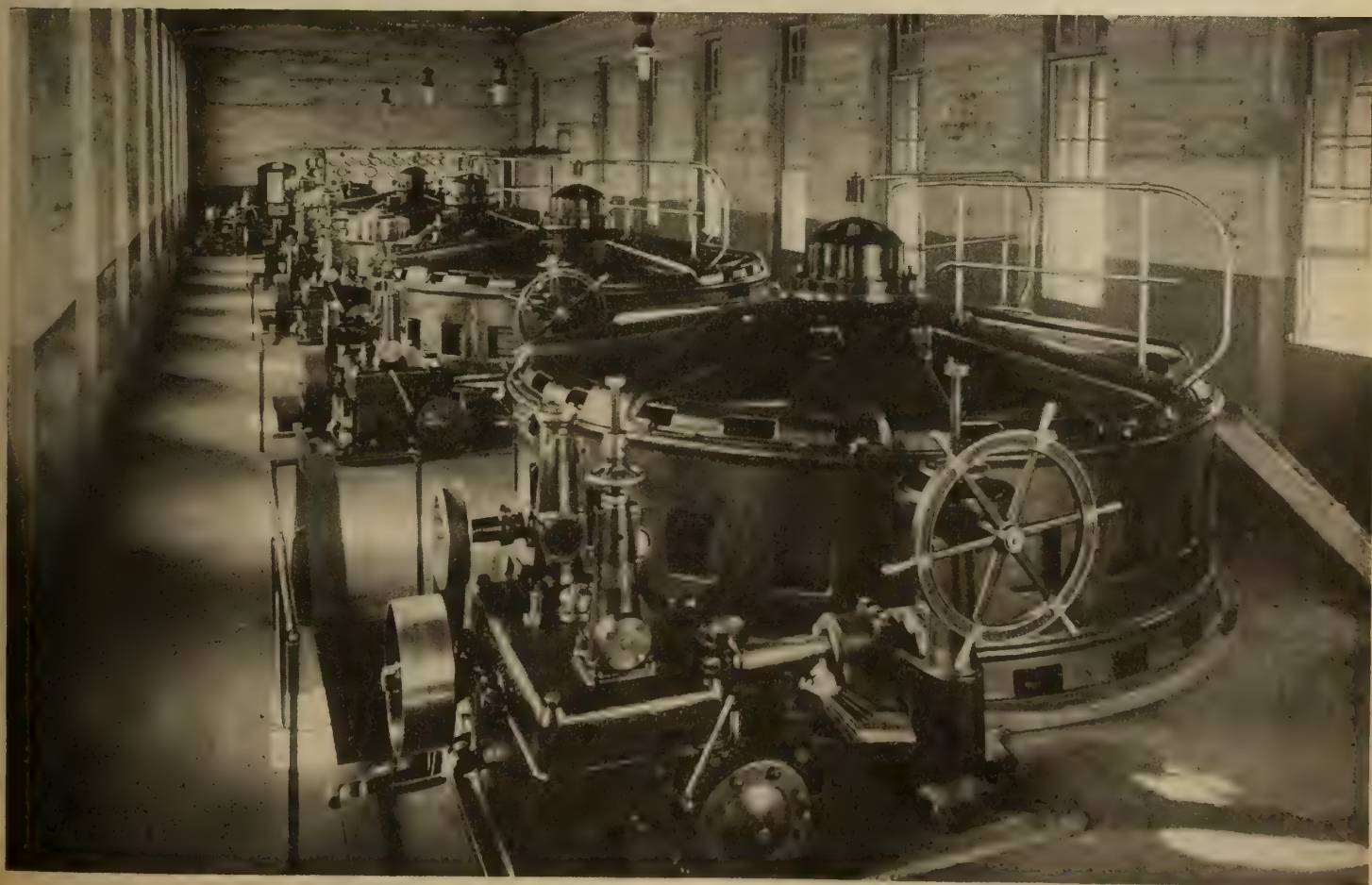
Niagara Falls, Showing Development on Canadian Side.



Power Plant of Granby Consolidated Mining, Smelting and Power Co., British Columbia.



Power Development at Shawenegan Falls, Quebec.



Hound Chute Power House, Montreal River, Cobalt District, Ontario.

WATER POWER IN EUROPE AND NORTH AMERICA

Dominion Water Power Branch Estimate 1915 (slightly revised)

Country	Area Sq. miles.	Population latest available figures.	H.P. Available	H.P. Developed	Per cent utilized	H.P. Available per sq. mi.	H.P. Developed per sq. mi.	H.P. Per Capita	
								Available	Developed
U.S.A.	2,973,890	98,783,300	28,100,000	7,000,000	24.9	9.4	2.35	0.28	0.071
Canada A	2,000,000	8,033,500	18,803,000	1,735,000	9.2	9.4	0.87	2.34	0.216
Canada B Populated	927,800	8,000,000	8,094,000	1,725,000	21.3	8.7	1.86	1.01	0.216
Austria-Hungary	261,260	51,173,800	6,400,000	566,000	8.8	24.8	2.17	0.13	0.011
France	207,500	39,601,500	5,587,000	1,100,000	11.6	26.8	3.14	0.14	0.016
Norway	124,130	2,391,780	5,500,000	1,120,000	20.4	44.3	9.02	2.30	0.468
Spain	190,401	19,588,700	5,000,000	440,000	8.8	26.3	2.31	0.26	0.022
Sweden	172,960	5,522,400	4,500,000	704,500	15.6	26.0	4.08	0.81	0.127
Italy	91,400	28,601,000	4,000,000	976,300	24.4	43.8	10.7	0.14	0.034
Switzerland	15,976	3,781,500	2,000,000	511,000	25.5	125.2	32.0	0.53	0.135
Germany	208,800	64,926,000	1,425,000	618,100	43.4	6.8	2.96	0.02	0.010
Great Britain	88,729	40,831,400	963,000	80,000	8.3	10.9	0.91	0.02	0.002

SOURCE OF INFORMATION: The basis of the table is the paper by M. Arthur Sawyer, Consulting Engineer, Montreal, read before the Canadian Society of Civil Engineers. Subsequent information obtained by Mr. H. E. M. Kennel and Mr. A. M. Beale, of the Dominion Water Power Branch is incorporated. The table is not absolutely correct, but indicates a reasonable summary of the situation.

reassuring to know that our largest and most important potential water powers are located within transmission range of present congested industrial districts within the "acute fuel area."

When considered in retrospect the production of hydro power in Canada has undoubtedly been an industrial achievement and an engineering triumph worthy

of our nation. In the short space of about twenty-five years, there has been developed and put in use, nearly 1,800,000 water horse power. A tabulated statement (see Plate No. 3) of the water power development in other countries, compiled recently from all available data, shows the universal importance of this resource and indicates the splendid comparative position Canada enjoys in both potential and developed water power. The present per capita power development in Canada is larger than all other countries except Norway. It is the same with respect to our known undeveloped water power. No country enjoys to a greater degree the benefits of cheap, dependable hydro power, and no country has had these benefits more universally applied for municipal, industrial and domestic use.

Fortunate Location of Our Water Powers.

The outstanding feature of the water powers of Canada is their fortunate location with respect to existing commercial centres. Within economic transmission range of practically every important city from the Atlantic to the Pacific, except those in the Central Western Prairies there are clustered water power sites, which will meet the probable demands for hydro-power for generations. The following table, prepared by the Dominion Water Power Branch indicates, reasonably accurately, the provincial distribution of the developed and undeveloped water powers within the settled portions of the Dominion.

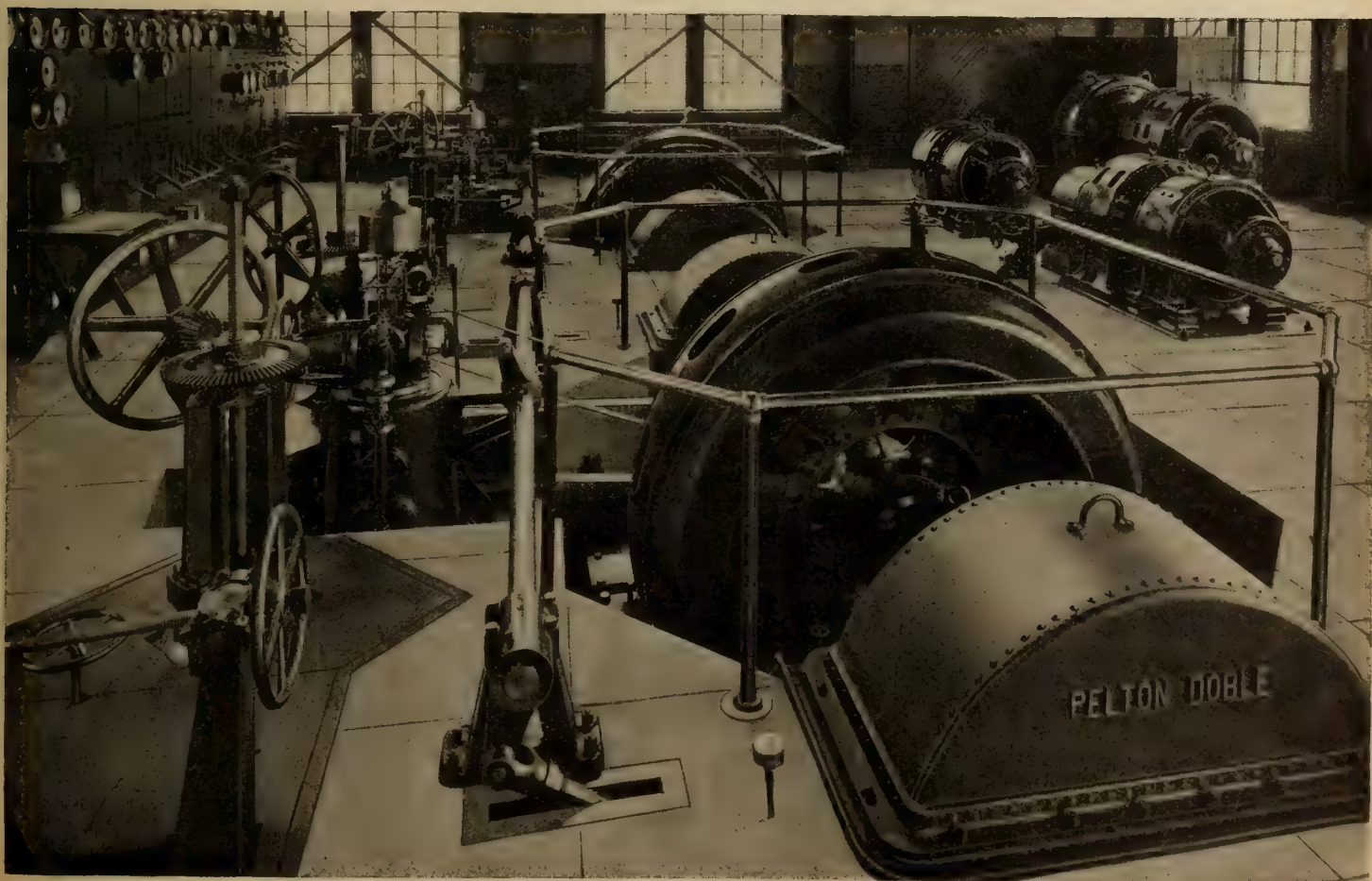
Province.	Power Available.	Power Developed.
Ontario	5,800,000	789,466
Quebec	6,000,000	520,000
Nova Scotia	100,000	21,412
New Brunswick	300,000	13,390
Prince Edward Island	3,000	500
Manitoba	3,500,000	76,250
Saskatchewan		100
Alberta		32,860
British Columbia	3,000,000	269,620
Yukon	100,000	12,000
Total	18,803,000	1,735,598



Canadian Collieries (Dunsmuir) Ltd. Wood Stave
Pipe near Power House.



Chaudiere Falls, Chaudiere River, Quebec.



Power House, Granby Consolidated Mining, Smelting and Power Co., B.C.

To visualize the interdependence and interrelation of all the fuel-power agencies available in Canada, and to offer something as a basis for general discussion, I have prepared a chart (Plate No. 4). If the chart indicates any one thing it conclusively proves the immensity and complexity of the problems involved in effecting the co-ordinated, concomitant development and use of all our fuel-power resources. The chart shows that this can be best realized following the evolution of a national master fuel-power policy for all of Canada.

Cheap power promises to be one of this country's greatest assets in the post-bellum industrial rivalry of nations for world trade. Our great fuel reserves, supported by our water power resources, represent a sure source of cheap power, and should guarantee Canada her share in world trade, if our varied fuel-power resources are availed of to their maximum possible advantage.

Conservation in Use of Coal

In the discussion of a paper presented at the New York meeting, Feb. 1918, of the American Institute of Mining Engineers, Edwin Ludlow, of Lansford, Pa., said in part:

For the first time in our history it has become the duty of the coal operator not only to practise the conservation of his own resources, but to preach conservation in the utilization of coal, by obtaining its full heat value. Coal operators in the past have been more interested in trying to mine coal at a cost that would enable them to keep their balance on the right side of the ledger, than in studying the full extraction of their coal resources. If they had done so in the past, only in favorable situations would it have been possible to mine and sell the coal in the competitive markets at a price that would return the cost of production. With the advance of prices and the demand for coal in excess of production, which is liable to last for many years, operators can now study more intensive methods for the complete extraction of the contents of their coal seams, with the security that their additional outlay and their higher costs will still net them a fair return on their investment.

With the higher cost of coal, it has also become a strong inducement for the manufacturer to pay closer attention to the results obtained from his boiler houses. In the past, coal has been so cheap that very little attention has been paid to scientific methods of firing, and to the full utilization of the B.t.u. in the coal purchased. A large manufacturer not long ago assured me that he was very particular about the purchasing of his coal, and insisted that all coal must be up to a standard of 14,600 B.t.u. In looking over his steam results, I called his attention to the fact that his coal should show an evaporation of 11 lb. of water per pound of coal, but that he was actually obtaining only 9 lb., and that by proper firing he would make a saving of at least 20 per cent. in the quantity of coal he used.

In a large number of cases that I have had occasion to investigate, it has been found that the fireman is really the arbiter of the quality and quantity of coal that is to be used, and that his methods of utilization are usually far from scientific.

It becomes the duty of coal men, when the opportunity offers, to call the attention of their customers to the conditions in their boiler rooms and point out to

them how their consumption of coal can be decreased by more economical methods of firing and better boiler practice.

Recent development of large power plants located at the mines, for the generation of electricity and its transmission to distant places, points to the most available method for the utilization of a great deal of inferior coal now thrown away at the mines, or not now mined, that could still be economically used under proper boilers if no transportation charges were added to the cost of this fuel.

This plan has already been put in practice in the anthracite region for the utilization of the finer sizes that have heretofore been considered too small to be economically used under boilers, and approximately three to four million tons of fine coal is being thrown away each year at the anthracite mines. Briquetting permits the transformation of this fine coal into a domestic fuel equal, for many purposes, to the best grades of anthracite.

These large electric plants are now burning the finest size buckwheat, which was formerly unsaleable, and are able to obtain a 200 per cent. rating on their boilers, and are sending out electricity at 110,000 volts to a radius of 75 miles. By doubling this voltage, it is estimated by electrical engineers that electricity can be sent at a less cost than fuel can be shipped to a radius of 200 miles, which would include Philadelphia and New York. The electric power required in these cities, instead of being manufactured at these points, could be more economically manufactured at a large central station located in the anthracite field. This development would relieve a tremendous congestion on the railroads in the handling of the fuel needed for these large electric plants in the cities, and would be utilizing a grade of fuel that has heretofore been largely thrown away at the mines. The accumulation of this class of material in the anthracite region amounts to at least 25,000,000 tons, and is being added to each year at the rate of 2,000,000 to 3,000,000 tons.

In the general production of anthracite, the Pennsylvania fields have probably reached their maximum, with very little virgin territory left to be developed, and no large increase can be expected in the output of anthracite coal for the future from the Pennsylvania fields, except by the utilization of what is now being wasted.

Mr. Chas. W. Goodale, vice-president, and Mr. Bradley Stoughton, secretary of the American Institute of Mining Engineers, have been visiting the Northwest, paying an official visit to local sections of the Institute in several cities. In Montana, they attended meetings at Butte and Anaconda, and in Washington, at Spokane and Seattle; they were cordially welcomed by members in all those cities.

Mine fatalities in British Columbia for the first quarter of the present year totalled five, compared with seven in the corresponding three months in 1917, according to the quarterly statement just issued by the Chief Inspector of Mines. Two occurred in coal mines and three in metalliferous mines, compared with one in the former and six in the latter last year. The coal mine fatalities occurred, one at the Michel colliery and the other at the Coal Creek colliery, of the Crow's Nest Pass Coal Company. Two of the fatalities in the metalliferous mines occurred at the Anyox mine of the Granby Company, and the third at the Florence mine in the Ainsworth division of West Kootenay district.

Alberta Mines Can Supply all Coal Needed in Prairie Provinces

By John T. Stirling.

The amount of coal produced in Alberta during 1917 was 4,863,414 tons, exceeding that of 1916 by 214,810 tons, notwithstanding the fact that the production during the year 1917 was considerably interfered with owing to labor troubles and lack of railway facilities in certain districts.

If the mines had worked steadily throughout the year with the present labor employed and the present amount of development, the amount of coal produced would have been approximately 8,000,000 tons or more than 3,000,000 tons in excess of the amount actually produced.

The importance of this will be readily understood when it is remembered that over 3,000,000 tons of coal imported from the United States was consumed in the provinces of Manitoba, Saskatchewan and Alberta, territory which should be entirely supplied by the production from the Alberta mines. It might, therefore, be very well asked why it should be necessary to import into Western Canada at the present time over 3,000,000 tons of coal per year, particularly at a time when the operation of munition plants and other essential industries in the United States and Eastern Canada is being very seriously interfered with owing to lack of fuel. Is it not absurd that such a condition of affairs should exist or be allowed to exist?

Not only can there be more than sufficient fuel produced from the Alberta mines to supply the demands existing, or likely to exist in the prairie provinces, but in addition a sufficient amount can be produced to supply that part of the United States immediately to the south of us. It is being fully demonstrated every day that railway locomotives, steam plants, buildings and blocks of all kinds and sizes can use Alberta coal, in Alberta, Saskatchewan and Manitoba with very satisfactory results, so that there appears to be no reason why the same fuel cannot be used entirely throughout these provinces, including Winnipeg.

The statement has been made on various occasions that Alberta coal will not store. While this may be true to a certain extent regarding 25 or 30 per cent. of the output produced, it is not true of the other 70 or 75 per cent.

It is hardly reasonable to expect that while the United States is cutting down her industries to a minimum she will continue to supply fuel to Canada, more particularly Western Canada, when there is a supply in Western Canada more than sufficient to cover all demands. It might, therefore, be expected that Canada will be able to rely less and less on the coal supply from the United States.

In the first place it is not to be expected that American manufacturers will submit quietly to coal being exported to Canada while their own industries are idle for days at a time owing to lack of fuel. Up to the present time they have shared and shared alike; but already complaints are being received and it is not in the least surprising to learn that the Deputy State Fuel Administrator for New York is criticizing the actions of shippers and producers in sending coal to Canada at a time when the industries throughout that State are being considerably interfered with owing to lack of fuel required to fulfil war contracts.

Although a large surplus of coal exists in Alberta, it is necessary that some action should be taken in order to make the plan of distribution more satisfactory.

The greatest demand comes in the fall and winter months, at a time when the difficulties of operation are greatest, owing to scarcity of labor and lack of railway facilities, as the railways during those months are busy moving the crops and it is difficult to get a sufficient amount of rolling stock for the shipment of coal.

In January, 1917, 8,550 men were employed in connection with the mining industry in Alberta, while in June this number was reduced to 3,091 and again increased to 9,812 in December. The overhead charges run on just the same, thus causing a very considerable loss. No industry can be built up in this manner on a permanent basis and it remains for some authority to institute some system that will utilize this enormous force that is at present going to waste.

It has been suggested on several occasions recently that the Ontario forest reserves should be cut down for the purpose of supplying fuel, although there is an excess supply of fuel to the extent of several millions of tons in Alberta coal mines and complete facilities there for its production. It has also been suggested that Alberta coals have not been used in greater quantities in Saskatchewan and Manitoba because greater profits have led the dealers to push the United States product in preference to that of Alberta.

The development of the coal mining industry in Alberta along the lines suggested above, means that instead of the Western provinces paying Pennsylvania coal operators and transportation companies nearly \$18,000,000 for coal in the year 1916, this money would have been kept in Canada. Had the Alberta coal fields been properly developed and a market found for the product in Canada, we would have been about \$18,000,000 better off in our trade balance.

MONTHLY PRODUCTION OF COAL IN CANADA BY PROVINCES*, 1917.
(In short tons.)

Month	Nova Scotia	New Brunswick	Saskatchewan	Alberta	British Columbia	Total
January.....	533,111	17,144	37,693	489,727	187,396	1,265,071
February.....	468,589	16,634	27,890	445,011	208,884	1,167,008
March.....	485,864	17,351	22,932	451,125	241,227	1,218,499
April.....	490,764	14,963	13,471	209,288	160,140	888,626
May.....	505,008	13,700	18,051	99,027	158,399	794,185
June.....	585,454	13,881	21,688	101,875	153,004	875,902
July.....	575,667	14,832	20,380	355,936	191,540	1,158,355
August.....	600,974	14,514	27,255	488,940	212,848	1,344,531
September.....	543,929	15,120	27,642	455,879	210,082	1,257,524*
October.....	578,572	16,697	39,968	540,576	230,871	1,406,684
November.....	538,019	16,629	51,485	588,674	238,632	1,433,439
December.....	418,733	17,195	46,849	497,081	225,906	1,205,764
	6,324,684	188,660	355,304	4,723,139	2,418,929	14,015,588*

The Use of Coal in Pulverized Form^{*}

By H. R. Collins.

The purpose of pulverizing coal before burning it is to make available every heat unit it contains. Machinery has been developed which will pulverize coal in one operation, delivering it to bins in front of the furnaces at an expenditure of about 17 hp.-hr., per ton, in a medium-sized plant. The cost of the operation depends upon the amount of moisture that must be expelled before pulverizing, the cost of labor, and the cost of coal delivered at the plant. At a small plant, requiring a pulverizer with a capacity of only half a ton per hour, the cost per ton pulverized will naturally be greater than at a plant requiring the largest pulverizer, with a capacity of 7 tons per hour.

The first step is to reduce large lumps to a size suitable for drying uniformly, before passing to the pulverizing mills; this is done in rolls, at a single pass. The second step is the elimination of moisture, in order to facilitate pulverizing to great fineness, while also increasing the heating effect and the temperature attainable when the coal is burned. There are other mechanical advantages in the handling of dried coal.

Driers are now manufactured which are able to eliminate moisture without distilling any of the volatile combustible matter in the coal; they are fired by hand or with pulverized fuel. The heat first surrounds the shell of the drier, being confined within a chamber where complete combustion takes place; the heated gases are then led through a duct to the discharge end of the drier and enter the inside of the shell at a temperature not exceeding 300° F. This temperature is maintained by the operator and is indicated by a pyrometer. Volatile combustible matter is not likely to be distilled until the temperature rises above 400° F.

On discharging from the drier, the coal is usually passed over a magnetic separator in order to prevent pieces of iron from going to the pulverizer. Two types are used; a magnetic pulley which automatically discharges its collection of iron, and a lifting type, from which the iron is removed by hand when convenient.

In the operation of pulverizing, the coal should preferably be reduced until 95 per cent. will pass through a 100-mesh and 70 per cent. through a 300-mesh sieve. Such a product is obviously an almost impalpable powder.

After pulverizing, the fuel is conveyed by one of several methods to the point where it is to be used. In several installations the pulverized coal is conveyed a distance of over 900 ft. Where possible, a bin should always be installed at the furnace, in order to guard against interruption of supply.

Feeders are practically indispensable for regulating the passage of the fuel from the bin to the burner. They are now made quite simple and highly efficient. They deliver the pulverized coal in definite quantities into an air current of fixed volume, where the air disseminates the pulverized fuel, surrounding every particle and putting it into condition to develop all its energy. The first to ignite are the volatile gases; these raise the temperature to the ignition point of the solid carbon, and before leaving the zone of heated air every particle has released its last heat unit. It is entirely possible to obtain temperatures ranging between 1900°

and 3500° F.; the highest temperature (3500°) I have observed was in an open-hearth, when the average temperature of the furnace itself at some time ranged from 3100° to 3200° F.

To justify the expense of erecting a special building, and installing special machinery to pulverize coal, the following advantages in its use may be enumerated:

1. Conservation of the country's fuel, by utilizing every heat unit in the coal, made possible by this method of consumption.

2. Reduction of labor for handling coal to the point of consumption, handling by the fireman, and the removal of ash and unconsumed fuel from the ashpits; practically all of this expense is avoided when fuel is burned in pulverized form. All the coal is received at one point, and thereafter it is handled entirely by automatic machinery, the human element being thereby eliminated, except for supervision, adjustment, and repairs.

3. From actual experience with many grades of coal we believe that every carbonaceous fuel in solid form, from lignites to the graphitic anthracites of Rhode Island, will yield its maximum measure of heat, if burned in a truly pulverized condition.

4. Coal in pulverized form can be injected into a furnace on a column of air, at very low velocity, thus allowing the expanding gases to liberate their heat without erosion of the refractories.

5. Pulverized fuel permits the maintenance of a constant temperature in a furnace, when the relative amounts of fuel and air have once been set, and the body of the furnace has been brought up to the desired temperature. It will continue thereafter under what is known as a test condition. Furnaces can be operated in this manner hour after hour, as shown by charts of recording pyrometers. The correct relationship between the amount of pulverized fuel and the volume of air, for any desired temperature, can be controlled automatically, after adjustment to the particular grade of coal in use, thus using a minimum of excess air. We have obtained gas analyses as high as 17 per cent. of CO₂.

Savings by the adoption of pulverized fuel in the operation of various types of furnaces have been attained as follows: heating and bushelling furnaces, 20 to 25 per cent.; puddling furnaces, 30 to 50 per cent.; open-hearth furnaces, compared with gas producers, 30 to 40 per cent.; copper reverberatory, smelting ore, 30 to 45 per cent.

In other furnaces, the consumption has been reduced to the following figures; continuous billet heating, 160 lb. of coal per ton of billets; desulphurizing iron ore in rotary kilns, 296 lb. of coal per ton of ore; drying and nodulizing iron ore in rotary kilns, on basis of 30 per cent. free moisture and 11 per cent. combined moisture 477 lb. of coal per gross ton of ore.

The above figures are from actual operations over extended periods, and confirm our contention that coal burned in true pulverized form is the only method by which every heat unit in the fuel will develop its full value.

^{*}Extracts from a paper to be read at the Colorado Meeting, American Institute of Mining Engineers, September, 1918.

PERSONAL AND GENERAL

Mr. S. S. Fowler, general manager for the New Canadian Metal Company, operating the Bluebell lead mine and concentrating mill at Riodel, on the eastern shore of Kootenay Lake, B.C., has been spending a vacation in Southern California.

Mr. Herbert Carmichael, for many years provincial assayer for British Columbia, is again in Victoria, after having been for several years engaged in investigating tungsten properties in Nevada and in other mining business in California.

Mr. E. Jacobs has gone to California, after having been for twenty-two years engaged in British Columbia, largely in supplying mining journals and other publications with information concerning the progress of mining in that province.

Mr. Geo. H. Aylard, of Victoria, B.C., general manager for the Standard Silver-Lead Mining Co., operating in the Slocan district of British Columbia, has been spending the latter part of the winter in Southern California.

Mr. J. B. Tyrrell has returned to Toronto from Oklahoma.

Mr. J. H. Stovel, resident Inspector of Mines for the Sudbury district, has resigned and has entered the employ of the E. J. Longyear Company. He is located at Bessemer, Alabama.

Mr. T. B. Williams, who for several years has been chief engineer for the Canmore Coal Company at Canmore, Alberta, has accepted the position of night foreman and engineer for the Jasper Park Collieries, at Pocahontas, Alberta.

Mr. D. C. Bard, formerly of Victoria, but now with the Alaska Corporation, Seattle, Washington, recently examined mining properties in the coast district of British Columbia, with the object of securing more ore producers to ship to Ladysmith smelter, Vancouver Island.

The Consolidated Mining and Smelting Co. is steadily increasing its output of zinc ore from its Sullivan mine in East Kootenay, B.C. The average quantity received daily at its electrolytic zinc refinery at Trail from that mine during the month of January was 185 tons; for February, it was 251 tons; for March, it was 320 tons, and for the first week of April, it was 432 tons a day.

Corp. John Thomas Garbutt, who enlisted in the 83rd Battalion, in July, 1915, died of wounds, May 19, 1916, at St. Eloi. His one brother, Fred, is in Scotland with a forestry battalion.

"LITTLE DAVID" PEDESTAL GRINDER.

A recent development of the "Little David" line of pneumatic tools, is the "Little David" Pedestal Grinder, No. 8, of the Canadian Ingersoll-Rand Company. This handy little machine is self-contained and can be readily moved. For mine work the most satisfactory location is with the sharpening equipment, so that as the drill steels are sharpened the shanks may be squared off.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Preparing for Resumption of Placer-Mining.

As the spring season advances, preparations for resuming placer-gold mining are being made. It is expected that the supply of water for gravel-washing will be at least as large as that of most ordinary seasons, the fall of snow during the winter having been sufficient to warrant this expectation. Hydraulic mine operators have returned to Cariboo and Atlin, and in both fields piping should be in progress by the time these notes shall be printed.

Dividends Paid by B.C. Mining Companies.

Dividends paid by metalliferous mining companies operating in British Columbia for the first quarter of the year are reported to be higher in total than for the corresponding period of 1916, and this notwithstanding that the Hedley Gold Mining Co.'s dividend was less than for a number of years, having been restricted to three per cent. for the quarter and the usual bonus of two per cent. additional not paid. This gives a total for the quarter from that company of \$36,000 as compared with \$60,000, which was long the total of the customary quarterly distribution of profits. On the other hand, the Consolidated Mining and Smelting Co.'s quarterly dividend totalled \$261,936, against \$219,695 for the first quarter of 1916. The Granby Consolidated Co.'s total for the quarter was \$364,972, a similar amount to that of other quarters ever since the rate was increased to ten per cent. per annum. The result is that the first quarter of 1918 shows a dividend total of \$672,898 as compared with \$645,657 for the corresponding period of 1917, or a net increase of \$27,241.

WEST KOOTENAY.

Ainsworth.—Ore shipment figures for the first quarter of the year show that in respect of total production there has been a substantial increase in the latter part of the period as compared with that of the first month. The total quantity of ore received at Trail from mines in Ainsworth division was 3,549 tons, of which 584 tons was the proportion for January, 1,319 tons for February, and 1,646 tons for March. The increase was not general, however, but was largely the result of a resumption of production at the Consolidated Co.'s No. 1 mine, from which 2,414 tons of silver ore, or more than two-thirds of the total, was received. The Bluebell, at Riodel, across Kootenay Lake from the town of Ainsworth, is again on the shipping list, troubles from excessive water underground having been in large measure overcome. The Florence, Little Phil, Spokane-Trinket, and Tariff, all near the western shore of Kootenay Lake; the Montezuma, on the South Fork of Kaslo Creek, and the Retallack and Bell in the western part of Ainsworth mining division, were other shippers during the quarter.

Will Explore Manganese Deposit.

Much interest is felt locally relative to the prospective development of a deposit of manganese ore, situated a few miles west of Kaslo, along the Kaslo and Slocan railway, on which some Seattle, Washington, men have secured an option of purchase. They state that a ready market can be found for the ore in the United States if exportation shall be permitted by the Canadian Government. Meanwhile, no work has yet been done, owing to there having been snow on the ground, but with the advance of spring this obstacle will disappear, and exploration of the extent and character of the ore will be undertaken.

Slocan.—Ore shipments to Trail from mines in Slocan and Slocan City divisions were considerably smaller in March than in February. The monthly totals for the quarter were as follows: For January, 712 tons; for February, 1,717 tons; for March, 575 tons; total for three months, 3,004 tons. Beside this there was a quantity of zinc concentrate shipped to the United States. Further, Northwest Mining Truth, published in Spokane, Washington, early in April, published the following statements relative to Slocan mines being operated by Mr. Clarence Cunningham, of that city, and associates: "Mr. Clarence Cunningham reports conditions at Slocan properties under his control as being satisfactory. Following declination of the Trail smelter to accept shipments of ore as usual from the seven producers being operated under his direction, arrangements covering two years were made with the United States Smelting Co., Midvale, Utah, and shipments approximating 25 carloads monthly have been going forward for some time. Half of this quantity comes from the Queen Bess, while generous shipments are also derived from the Hewitt and Van-Roi, near Silverton. Hewitt concentrate contains about 62 per cent. lead and from 250 to 275 oz. of silver to the ton. Queen Bess ore runs more than 60 per cent. lead and about 90 oz. of silver to the ton. At the Sovereign, on Reco Mountain, near Sandon, a new body of clean ore has been found, while the Wonderful, on the opposite side of Sandon, is also yielding clean ore in quantity. At the Idaho and Alamo, on the mountain west of the Queen Bess, work has been continued in two places throughout the winter with excellent results.

"Briefly, every property under Mr. Cunningham's management now shows clean ore in quantity, while excellent saving is being made at the two concentrating mills on Four-mile Creek, near Silverton. It is understood that the Ruth mill, at Sandon, has been secured under lease and will be used for concentrating second-class ore from the Wonderful and Sovereign mines. If the results of development at the Idaho and Alamo come up to present expectations it is probable that the old concentrator at Alamo, on the C.P.R. Co.'s Slocan & Nakusp railway, about two miles below the mines, will be thoroughly overhauled and placed in operation next summer. The average number of men employed on the seven properties the Cunningham interests are operating is about 250."

Trail.—Ore receipts at the Consolidated Mining and Smelting Co.'s smelting works at Trail during the first quarter of the current year totalled 103,118 tons, of which 90,485 tons was ore from mines operated by the company and 12,633 tons was of custom ore. The monthly proportions of this total were as follows: For January, 27,404 tons; for February, 33,989 tons; for March, 41,725 tons. These figures serve to show the gradual progress that has been made since the settlement of strike troubles at the works last December.

More than one-half of the ore received during the period under notice was gold-copper ore from the company's mines in Rossland camp, namely the Le Roi, Centre Star-War Eagle group, and White Bear, these having together shipped to Trail 15,843 tons in January, 16,790 tons in February, and 22,340 tons in March, making a total output of 54,973 tons. Receipts from the company's Sullivan zinc-lead mine, in East Kootenay, totalled 22,927 tons, of which 22,698 tons was zinc ore and 229 tons lead ore. From the Emma mine, in Greenwood division of Boundary district, receipts to-

talled 9,383 tons of copper-gold ore, and from the No. 1 mine, in Ainsworth camp, West Kootenay, the total was 2,414 tons of silver ore. Shipments from other company mines were comparatively small, as follows: St. Eugene, East Kootenay, 281 tons of lead ore; Molly Gibson, in Nelson division, 342 tons of silver-lead ore; Lucky Thought, 129 tons, and Richmond-Eureka, 36 tons, both of silver-lead ore from Slocan division. Custom ore was in the proportion of 2,483 tons for January, 5,906 tons for February, and 4,244 tons for March.

Taking the receipts from the various districts or divisions, the quantities were as follows: From East Kootenay, 24,657 tons. From West Kootenay: Rossland, 59,057 tons; Ainsworth, 3,549 tons; Slocan, 3,004 tons; Nelson, 655 tons; Trout Lake, 108 tons, and Arrow Lake, 10 tons. The total from Boundary district was 9,413 tons; from Kamloops division, Yale district, 836 tons, and Vancouver Island, 76 tons. Mines in the State of Washington shipped to Trail only 1,753 tons during the quarter, but much lead ore would have come from that source had lead-market conditions been such as would have admitted of its being smelted at Trail. As indicating the unfavorable position in regard to lead ores, it may be pointed out that of a total in excess of 100,000 tons of British Columbia ore received during the quarter, less than 6,000 tons was silver-lead ore, while the chief metal content of more than 60,000 tons was gold, of about 25,000 tons was zinc, and of 10,000 tons was copper. These quantities are approximate, yet they serve to give a general idea of the metal contents of the ores received at Trail during the first quarter of this year.

VANCOUVER ISLAND.

Coal Mining Companies Busy on Vancouver Island.

Coal-mining continues to be especially active on Vancouver Island, with the producing mines being operated to the full extent practicable under present conditions, there still being fewer miners obtainable than could be given employment at these collieries. The Canadian Collieries (Dunsmuir) Limited, is working its larger mines in both the Comox and Extension fields, and is proceeding with the development of a small mine near South Wellington. The Western Fuel Company continues to make a large output of coal from its Nanaimo colliery, with its No. 1 and Protection Island mines being operated, and its Reserve Shaft mine, several miles south of Nanaimo, opened in recent years and now also an important producer. This company, also, is developing a property that it is planned shall add considerably to the output of coal. The Pacific Coast Coal Mines, Ltd., is making its largest production from the Morden mine, opened in recent years in a part of the South Wellington field that had not previously been mined for coal, and its outlook is favorable for an increasing production as demands shall warrant further expansion, already provided for by the installation of modern plant and machinery and the establishment of shipping docks and loading appliances equal to handling a large quantity of coal. Progress is being made with the development of the coal lands situated a few miles south of South Wellington, acquired and now being opened by the Granby Consolidated Mining, Smelting, and Power Company.

Metalliferous mining is still having attention notwithstanding that ore-smelting facilities are not at present available under conditions allowing of a satisfactory return being received should ore be shipped. The Ladysmith Smelting Corporation has made it known that whenever there shall be a sufficient supply of ore

obtainable to ensure the continuous operation of its works, it will resume smelting at Ladysmith, but for the time the smeltery is idle, there being no profit in its operation intermittently. This company is developing what is known as the Thomson-Tolmie copper property, situated on Sooke Peninsula, southwest of Victoria, and it is expected that eventually sufficient ore will have been developed to make it a producer of importance. Another copper property in the same part of the island has already had the attention of local men who have been much encouraged by results obtained from the shipment of ore in quantity—several hundred tons—to Ladysmith. It is stated that New York men have lately bonded this mine, and are having it examined with a view to doing considerable work on it if a favorable report shall be received. Shipment of ore from the Blue Grouse, near Cowichan Lake, has been made to up-country smelting works, but freight and other charges have been found too high to allow of more being shipped under the circumstances. Another mine on which work has been done is that known as the Indian Chief, on Sidney inlet, west coast of Vancouver Island, and concentrating plant has been put in at it, but little is known as to recent results, except that beside the concentrating ore there has also been found some copper ore of high grade.

THE U.S. WAR MINERALS BILL.

Washington—According to the Boston News Bureau, the outlook is propitious for early action on the U.S. war minerals bill, carrying \$50,000,000 to encourage domestic production of rare minerals needed by the government for war-making purposes.

The terms of the measure carry the power of price fixing by the President, who is authorized to place the carrying out of its regulations in the hands of the secretary of the interior. It is definitely recognized as an administrative measure, and is strongly backed by Secretary Lane. Among the large number of minerals included in the bill, many are found which will be drawn upon heavily in war requirements, thus necessitating a price-fixing provision to stabilize the markets, as well as to furnish the incentives to high production through assurance of reasonable profits. While some objections have been raised against extension of the price-fixing provision in coming legislation, it is pointed out by supporters of the measure that such definite authority is more essential in the present instance than in dealings by the government with manufactured commodities, much as virtually new industries are called for in some instances in the present bill.

The bill also carries power to increase tariff rates on any of the war minerals whose production is to be encouraged, if this should be found necessary to prevent the government from confronting a loss by coming into competition at any time with imports of the same materials from abroad. This precaution naturally contemplates a situation such as would be brought about by the declaration of peace during any period which might be covered by the government's guarantee of a minimum price.

No small consideration has been given to the question of ship tonnage in the preparation of the bill. It has been estimated that the development of iron pyrites production alone in the United States will serve to release thousands of tons of space for other requirements in war transportation. In many respects, however, increased production is aimed at in direct connection with urgent war needs.

Advice From the Fuel Controllers

Ottawa, April 19.—C. A. Magrath, Fuel Controller for Canada, to-day made the following statement:

"The new fuel regulations went into effect on the 1st of April. Provision is made therein that no consumer may be supplied with more than 70 per cent. of his estimated normal needs for the year ending 31st March, 1919. I desire to point out, however, that this provision is not in any way designed to place obstacles in the way of consumers laying in coal supplies during the summer time. It is merely intended to ensure a more even distribution of coal receipts.

"The regulations on this point are extremely elastic, and provision is made whereby the moment the consumers in any municipality have been supplied with 70 per cent. of their requirements, the Provincial Fuel Administrator may, on the advice of the local Fuel Commissioner, entirely suspend the restriction referred to or may increase the percentage that may be delivered in any way he deems desirable. My advice to consumers throughout Canada is to get their coal supplies at the earliest possible moment and in as large quantities as they are able to, consistent with any restrictions that may be in force at the time.

"It is well for the people of Canada to bear in mind that we are absolutely dependent upon the United States for the great bulk of our coal supply. The United States Fuel Administration, in placing Canada on the same basis as the states of the Union with reference to coal shipments, has displayed a spirit of fairness which all Canadian will duly appreciate. There is, however, the implied moral obligation resting on Canada to conserve her fuel supply to assist the authorities across the line to solve the common fuel problem in any practical manner that may be indicated. Dr. Garfield, the United States Fuel Administrator, has recently issued a statement in which he lays the greatest possible stress on the public placing their orders for coal at the earliest possible moment. This advice, of course, applies with at least equal force to Canada.

"Dr. Garfield, in discussing the fuel situation south of the line, points out, that it is fundamentally a transportation problem. He goes on to say that there are sufficient coal cars and locomotives available only if every car and every locomotive is used to its maximum capacity every day in the year."

Toronto, April 22.—Some unexpected and most important announcements regarding the fuel and power situation, both in Canada and the United States, were made by Sir Henry Drayton, Dominion Power Controller; Sir Adam Beck, chairman of the Hydro Power Commission, and Commissioner R. C. Harris, Associate Fuel Controller, before a gathering of business men at the City Hall yesterday afternoon. Briefly stated, they were to the effect that, owing to the tremendous demands for electrical energy and fuel in both countries, to enable manufacturers to increase the output of munitions which were urgently needed, further restrictions would in all probability have to be placed on the use of light, power and coal by non-essential industries, merchants, storekeepers and private citizens. Beyond this the people were warned that next winter they must be prepared to suffer inconvenience and some measure of discomfort during the extremely cold weather, as it would be an absolute impossibility for the United States to supply sufficient coal to meet the normal demand for industrial and domestic uses. Canada would obtain

its proportionate share of the coal mined, and it would be distributed pro rata throughout the country, but there would be a shortage. The people of Toronto and of every city and town in Ontario, would have to conserve their coal supplies and be content to keep their houses less comfortable and warm than in former winters. In fact, they even might be called upon to close up part of their houses in order to conserve heat. Further than this, they would be well advised to endeavor to secure some substitute for coal, even if the thermal values were not so great. The question of comfort could not be considered, as the supply of coal coming from the States would only suffice to prevent actual hardship and distress.

Ottawa, April 20.—At the close of the conference held here this week of coal operators, labor delegates and transportation representatives with Mr. Neale, representing the United States Fuel Administration, and Mr. C. A. Magrath, Dominion Fuel Controller, a memorandum was submitted by Mr. Magrath covering the chief developments of the conference, which lasted for a couple of days.

The memorandum contained the important statement that the United States Fuel Controller felt it his duty to inform the Canadian Fuel Controller, so that he could pass the information to the Western provinces of Canada, that the situation is as follows:—

1. That anthracite coal supplies to points in Western Canada will be very materially restricted during the present coal year.

2. Under the circumstances, it is safe to predict that no American anthracite coal will be available for shipment to points west of Winnipeg.

3. It is also proposed to restrict shipments of anthracite to Canadian lake ports during the early part of the present season.

4. That the public, both East and West, must be given to understand distinctly that conservation of coal must be practised to the utmost extent by all classes of consumers.

Mr. Magrath's memorandum said that Sir George Foster had been able to announce that the attitude of the United States Fuel Administration was that Canada would receive precisely the same treatment as the various states of the Union. The Western States had been given to understand that they must use the softer coal of the West and that the available anthracite would have to be conserved for the purpose of supplying the Eastern part of the Union and the Provinces of Ontario and Quebec.

The Western coal operators stated their ability to increase the production of bituminous coal by 1,280,000 tons and of lignite coal by 1,225,000 tons. These increases would represent the amount of coal that could have been mined during the times the mines were idle last year due to strikes and want of railway transportation. The figures would not hold good unless the same amount of labor was available as last year, and unless the railways were able to furnish transportation required.

The operators urged that dealers and the public take a large portion of their supply during the summer months, when the railways are in a position to handle it.

The memorandum of the Nova Scotia operators stated that the production of Nova Scotia mines had been estimated at 5,950,000 tons, but the production actually attained was 5,660,000 tons. The operators reported a considerable improvement in transportation facilities, and pointed out that scarcity of labor had been the main factor in the reduction of output.

House Discusses Fuel Problem

In the House of Commons on April 15th Mr. J. E. Armstrong of Lambton proposed a resolution urging that deposits of bituminous and anthracite coal in Canada, located in the extreme Eastern and Western portions of the Dominion be more thoroughly utilized, that peat and lignite deposits be developed, and that the Government make a special effort to this end. Development of Canadian coal areas, he said would materially increase production.

Turning to natural gas, Mr. Armstrong stated that the waste of this valuable product in the West was enormous. He had, he said, written to the Interior Department protesting against the waste. Natural gas, he said, was the cleanest and best of fuel, and was used extensively in the United States for the manufacture of gasoline. The Government ought to take action to conserve the gas supply of the Dominion.

Powdered coal was another product which the speaker thought could be successfully used in Canada. It has been a success in Brazil, and also in the United States.

The development of Canada's great water powers for the production of electricity was urged by Mr. Armstrong. He recommended the appointment of a Minister whose duties should consist in developing water power for light, heat and power. In the Dominion, he said, 17,000,000 horsepower was undeveloped. The peat deposits of Canada should also receive the attention of the Government.

In closing, Mr. Armstrong emphasized the seriousness of the fuel situation, and insisted that drastic measures must be enforced by the Government. At present the Dominion was absolutely dependent on the United States, and if that country should be unable to supply our demands we would find ourselves in a bad situation.

W. D. Cowan, Regina, wanted to know what the Government was going to do in the line of developing the Saskatchewan coal fields. He was pleased to hear from the previous speaker that an Order-in-Council providing for an expenditure of \$400,000 on the Saskatchewan coal fields had been passed.

In Saskatchewan, said Mr. Cowan, while these coal fields were only producing 200,000 tons a year, people were importing Pennsylvania coal. He argued that Saskatchewan was not a legitimate market for coal from Pennsylvania.

H. C. Hocken (Toronto West) spoke of the suffering in Ontario last winter owing to lack of fuel. If Western coal areas were developed, Pennsylvania coal now going to the West might be diverted to Ontario, and material improvement thus effected. Mr. Hocken urged the development of water powers with a view to the operation of railways by electricity and the saving of coal.

The Minister of Mines dealt briefly with the efforts of the Government to develop peat production in Canada. About 140,000 acres of peat bogs had been mapped out. He referred to the experiments which had been made by the Government at Alfred, Ontario, saying that \$18,000 had been spent there in experimental work. In 1910 the operations at Alfred were discontinued. A private corporation which subsequently failed, taking over the plant. Owing to the fuel shortage last year, the Government had resumed experiments at Alfred, and these were now being conducted in co-operation with Provincial Government of Ontario. In

closing, Mr. Burrell said that he would bear in mind the suggestions which had been brought out by the debate.

Hon. Arthur Meighen replied to the statements of Mr. Armstrong in respect to the escape of natural gas on Dominion lands in Alberta. Mr. Meighen denied that there was any laxity on the part of the Mining Lands Branch of the Interior Department, and indicated the steps taken to prevent any waste of natural gas. Regulations to control Dominion mining lands, Mr. Meighen said, had been in effect for the last four or five years.

W. A. Buchanan (Lethbridge) felt that Western mines could meet the needs of the Western provinces and some of the needs of Eastern Canada. He was not quite sure, however, whether it was feasible to ship Western coal to Eastern markets. He thought the question of storage might well be taken into consideration by the Government, as it would go far towards solving the problem in Alberta.

J. C. Douglas (South Cape Breton) declared that the three greatest questions of the day were those of continued reinforcements for the troops in France, increased food supplies and increased coal production. He said that if the Fuel Controller was appointed mainly with a view to increasing production in Canada, and not to borrow coal from the United States, then he had been unsuccessful in his work. Since the appointment of Mr. Magrath in July, last, there had been a decrease of 600,000 tons in the production of coal in Eastern Canada.

To remedy the situation, he proposed that a reduction in the overhead charges of collieries should be effected, underpaid employes should receive increased wages, mining machinery in Nova Scotia should be improved, and companies should be made to spend excess profits in improving conditions at the mines generally. He also urged the appointment of an energetic man as a "speeder-up," the appointee to be given wide powers.

Dr. Clark (Red Deer) advocated the lifting of restrictions on the entry of mining implements to this country, declaring that only a nominal duty on such tools had existed in Argentina for a great many years. He urged the removal of the duty, but cautioned the Government not to give money away where the tariff had failed.

Alex. McGregor, Pictou, suggested that the Dominion Government should co-operate with the Provincial Government of Nova Scotia and take over the mines

of the Acadian Coal Company, operating them in such a way as to benefit the public. He did not approve the way these mines were being operated by the company.

Dr. Edwards argued that Dr. Michael Clark's assumption that the removal of the duty from coal would tend to solve the fuel problem was incorrect. The kind of coal which was used for domestic purposes and to heat houses was anthracite coal, on which there was no duty. He maintained that the trouble last year was due largely to a shortage of cars and inclement weather, which made it impossible to move the fuel.

Sir George Foster devoted the major portion of his remarks to a vindication of the Fuel Controller and an explanation of what his duties actually are. He said that the Government, in making the appointment, did not have in view the enhancing of coal production in Canada, so much as making it definitely sure that the allotment of 16,000,000 tons of coal from the United States should be obtained and equitably distributed at a fair price in Canada. He maintained that Mr. Magrath had successfully carried out his part of the programme, with the help of the United States authorities, who had been eminently fair and sympathetic in their dealings with him.

"His duty was to get the coal to Canada, but not to transport it after it had been brought across the border. The bad situation last winter, in connection with the transportation, was responsible for a great deal of the suffering throughout the country. Some people fear that we shall suffer privations again this year. If things go on ordinarily well and the transportation difficulties are not so great as last year, we shall get out allotment of 16,000,000 tons as usual."

With regard to the Western lignite coal, Sir George stated that the Government, in co-operation with the Provincial Governments of Manitoba and Saskatchewan, proposed to establish one or two units for making briquettes near Estevan. If this experiment proved a success, the Government could then choose whether it would continue the manufacture of briquettes for public consumption or leave this to private enterprise. A start on the installation of the Estevan plant would, said the Minister, be made at once, but it would be a year before manufacture of briquettes could be started. Briquettes could be manufactured at a cost of between six and seven dollars per ton and the supply of low-grade lignite coal in the West was practically inexhaustible.

CANADIAN PRODUCTION OF COAL IN RECENT YEARS.

	1915		1916		1917	
	Tons	Value	Tons	Value	Tons	Value
Nova Scotia.....	7,463,370	\$16,659,308	6,912,140	\$18,514,662	6,324,684	\$23,740,176
New Brunswick.....	127,391	309,612	143,540	386,016	188,660	705,673
Saskatchewan.....	240,107	365,246	281,300	441,836	355,304	662,228
Alberta.....	3,360,818	8,283,079	4,559,054	11,386,577	4,723,139	14,197,756
British Columbia.....	2,065,613	6,455,041	2,584,061	8,075,190	2,418,929	8,308,581
Yukon Territory.....	9,724	38,896	3,300	13,200	4,872	29,232
	13,267,023	\$32,111,182	14,483,395	\$38,817,481	14,015,588	\$47,643,646

IMPORTS OF COAL IN 1916 AND 1917.

	1916			1917		
	Tons	Value	Average	Tons	Value	Average
Bituminous, round and run of mine.....	9,504,552	\$12,368,679	\$1.30	12,407,486	\$33,712,894	\$2.72
Bituminous, slack.....	3,505,236	3,704,624	1.06	3,129,776	8,739,877	2.79
Anthracite, coal and dust.....	4,570,815	22,216,363	4.86	5,320,198	28,109,586	5.28
Total.....	17,580,603	\$38,289,666	\$2.18	\$20,857,460	\$70,562,357	\$3.38

CANADIAN MINERAL PRODUCTION BY PROVINCES 1916 AND 1917.

Province	1916		1917		Increase (.) or Decrease (—)	
	Value of Production	Per cent. of Total	Value of Production	Per cent. of Total		
Nova Scotia.....	\$20,002,262	11.31	\$25,333,643	13.13	5,291,381	26.40
New Brunswick.....	1,118,187	0.63	1,372,620	0.71	254,433	22.75
Quebec.....	14,406,598	8.13	17,115,161	8.87	2,708,563	18.80
Ontario.....	80,461,323	45.41	88,821,815	46.02	8,360,492	10.39
Manitoba.....	1,823,576	1.03	2,539,393	1.32	715,817	39.25
Saskatchewan.....	590,473	0.33	832,335	0.43	241,862	40.96
Alberta.....	13,297,543	7.50	16,426,154	8.51	3,128,611	23.53
British Columbia.....	39,969,962	22.56	36,161,528	18.74	3,808,434	9.53
Yukon.....	5,491,610	3.10	4,380,188	2.27	1,111,422	20.24
Dominion.....	\$177,201,534	100.00	\$192,982,837	100.00	15,781,303	8.91

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 17 cents per lb.

April 24, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10 cents per lb.

Lead, 9 cents per lb.

Antimony, 16 cents per lb.

Copper, casting, 28 cents per lb.

Electrolytic, 28½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

April 24, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

April—	New York cents.	London pence.
12	93¾	46¼
13	93¾	46¼
15	95¼	47
16	95⅝	47¼
17	95⅝	47¼
18	95⅝	47¼
19	96⅝	47¾
22	99¼	49

NEW YORK MARKETS.

Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 7.00.

Lead, outside, normal, 7.12½.

Spelter, prompt western shipment, 6.87½.

Antimony—

Chinese and Japanese nominal, 12.25 to 12.50.

Aluminum—Government price, carload lots, f.o.b. plant:

98-99% Virgin, 32.10.

98-99% remelt, 32.10.

No. 12 Aluminum Co., 32.30.

No. 12 remelt, 32.30.

Sheet 18 ga. and heavier base, 40.20.

Powdered aluminum, 65.00 to 70.00.

Metallic Magnesium—99% plus \$2.00 to 2.50.

Nickel—Shot and ingot, 50.00.

Electrolytic, 55.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$120.00—125.00.

Platinum (pure), \$105.00.

10 per cent. Iridium, \$113.00.

Cobalt (metallic), 2.50 to 3.50.

Tungsten—

Scheelite, 24.50.

Wolframite, 20.00 to 24.00.

Gravel Fluorspar: f.o.b. mines—

Prompt, 33.00 to 35.00.

Contract, year 1918, 25.00 to 28.00.

Silver (official), 99¼.

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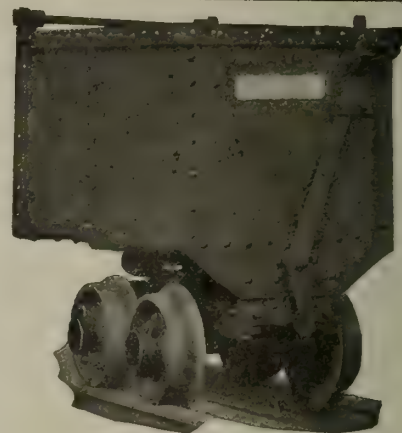
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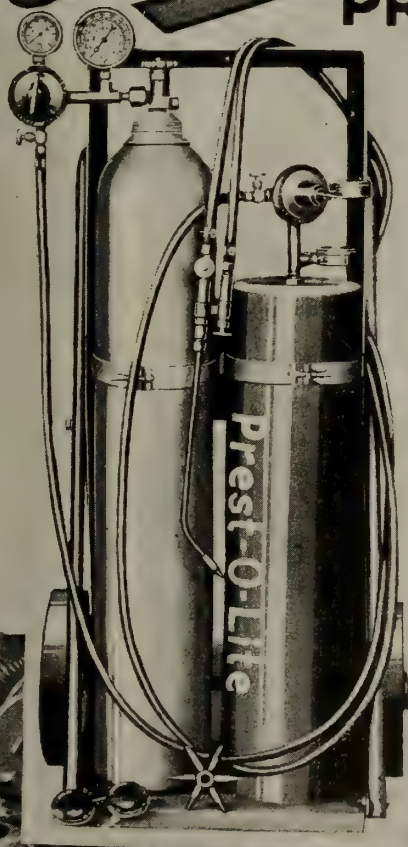
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1—3 ton 24" gauge, Jeffery, 500 volt, used but in splendid condition.
1—3 ton 36" gauge, Jeffery, 500 volt, new.
1—3 ton 36" gauge, Jeffery, 250 volt, used, but in splendid operating condition
2—Westinghouse, 5 ton trolley type, 27" gauge new.
2—Gen. Electric, 7 ton, trolley type, 36" gauge, new.

1—10 ton Morgan-Gardner, 36" gauge, 500 volts.
1—10 ton Morgan-Gardner, 36" gauge, 250 volts.
4—Gen. Electric, 5 ton, 30" gauge, storage battery type, used, but in good condition.
2—G. E., 4 ton, 24" gauge Storage Battery Locomotives.

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1—200 h.p. Worthington 2 stage, 12 in. turbine pumps, rated capacity 4000 G.P.M. at 60 lbs. pressure, direct connected to one 100 h.p., 3 phase, 60 cycle, 440 volt, 575 R.P.M. Westinghouse induction motor, complete with auto starter and no voltage release.

1—1160 ft. Sullivan two-stage belt driven air compressor, complete.
1—1586 ft. Sullivan two-stage belt driven air compressor, complete.
1—50 h.p. Foss Gas Engine, speed 200 R.P.M., one cylinder, flywheel 4 ft. x 12 in., used only three weeks.

Transformers

25 CYCLE					
No.	K.V.A.	Phase	P. Volt	S. Volt	Make
4	1000	1	45000	12000	G. E.
3	375	1	13200/6600	440/220	A. C.
3	100	1	13200/6600	2200	G. E.
4	100	1	2200	370/185	G. E.
2	100	1	2200	440/220/110	West.

60 CYCLE					
No.	K.V.A.	Phase	P. Volt	S. Volt	Make
3	6500	1	26000/19000	4400/2200	West.
			16000/11000		
4	1800	1	23000/11000	2200	G. E.
3	300	1	2200	110/220	Pittsburgh
3	670	1	2300	105/90/70/60	G. E.
12	250	1	6300	2300	G. E.

Motors

3 PHASE—25 CYCLE					
No.	H.P.	Make	Type	Volt	R.P.M.
1	1200	G. E.	I.P.	2080	250
5	175	West.	C.S.	220/440	480
4	125	West.	C.K.	220/440	480
1	100	G.E.	I.K.	220/440	1500
2	50	West.	C.S.	2200	750/900

3 PHASE—60 CYCLE					
No.	H.P.	Make	Type	Volt	R.P.M.
1	1000	West.	H.F.	2200	360
1	300	A.C.	ANY.	2200	505
1	300	G. E.	ATI.	2300	225
1	290	G. E.	ATI.	2080	600
3	250	Burke	Ind.	6500/2200	514

Belted-Generators

DIRECT CURRENT					
No.	K.W.	Volt	Wdg.	Type	R.P.M.
1	500	550	C.P.	M.	320
1	450	550	C.P.	S.	800
1	450	250	C.P.	M.	320
1	100	250	C.P.	M.P.	475
1	125	125	C.P.	M.P.	600
1	100	125	C.P.		720
1	65	125	C.P.	F.H.	875

ALTERNATING CURRENT					
No.	K.V.A.	Volt	Ph.	Cy.	R.P.M.
1	250	2300	3	60	600
1	150	220/440	3	60	600
1	120	220/440	3	60	900
1	100	2200	3	60	900
1	75	2300	3	60	276
1	60	220	3	60	900
1	50	2200	3	60	1200

Engine Generator Sets

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1—500 K.W., 550 volt, 320 R.P.M., C.P., W.D. Westinghouse 3-bearing Generator, belted to Allis-Chalmers Corliss Steam Engine; 150 lbs. steam pressure.
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1—105 K.V.A., G.E., Type A.T.B., 3 phase, 60 cycle, 2300 volt, 257 R.P.M. and 14 x 15 Phoenix engine.
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1—150 K.W., G.E., 125/250 volt, 900 R.P.M., D.C., Gen., direct connected to suitable syn. motor, 2300 volt, 3 phase, 60 cycle, complete with switchboard equipment.
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A Suggestion to Mine Operators

We are informed by Mr. Reginald E. Hore, editor of this Journal that last year many mine operators gave considerable encouragement to their employees to cultivate land, and thereby increase food production.

This most excellent work is highly appreciated by the Organization of Resources Committee, and we trust that it will be continued this year.

We also wish to suggest to mine operators, who have not yet attempted work of this kind among their employees, that they should, as a matter of good citizenship and national expediency, place at the disposal of their employees any land which they are not using and which may be suited to the cultivation of vegetables.

By intelligent effort in the cultivation of a piece of land the average citizen can cultivate enough vegetables to support himself and family through the winter. And remember, if food restrictions are in force next winter a supply of vegetables in one's cellar will be very useful.

It is suggested that the operators might arrange to have the land ploughed and secure a supply of seed or plants as a stimulus to their worker's endeavours.

We will gladly send to any mine operator a supply of booklets for distribution among employees, which will give them practical, easily understood information on vegetable growing; and we shall welcome a request for a quantity of these booklets as evidence of any mine owner's intention and desire to co-operate.

State how many booklets you require and address your letter to:

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Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Preliminary returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$71,060,942, of which the metallic production was \$56,845,788.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

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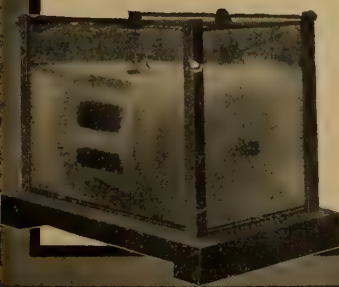
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Recent Publications

- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

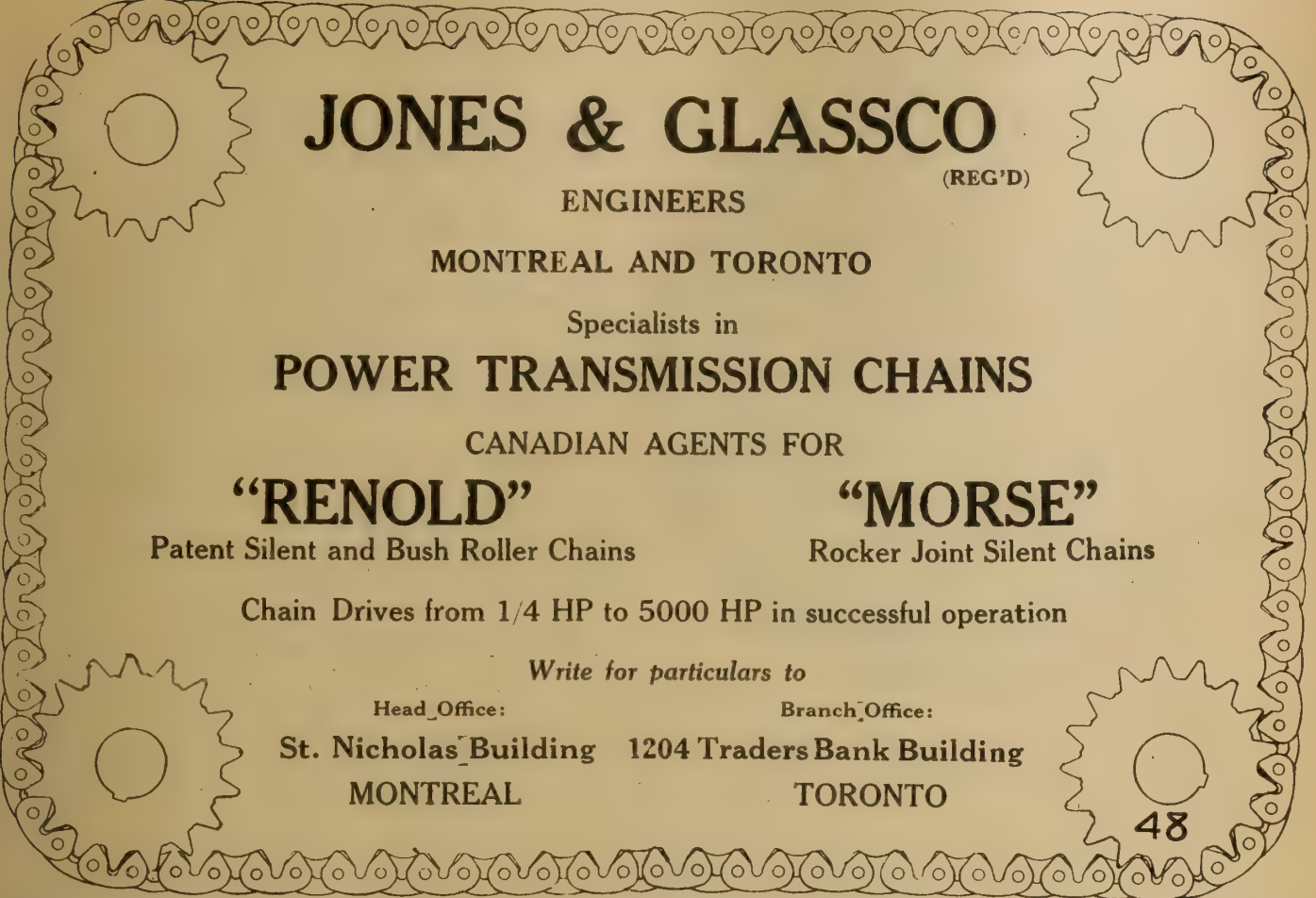
Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.



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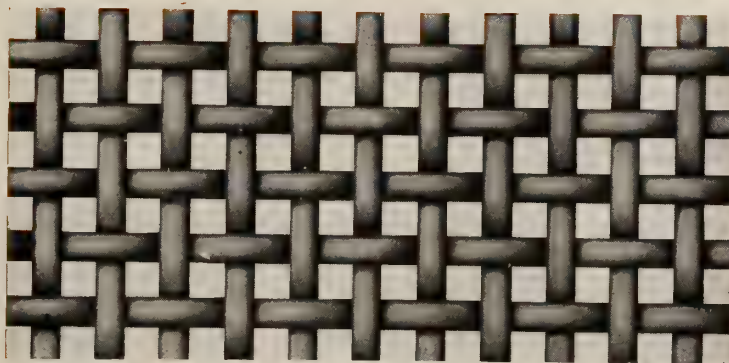
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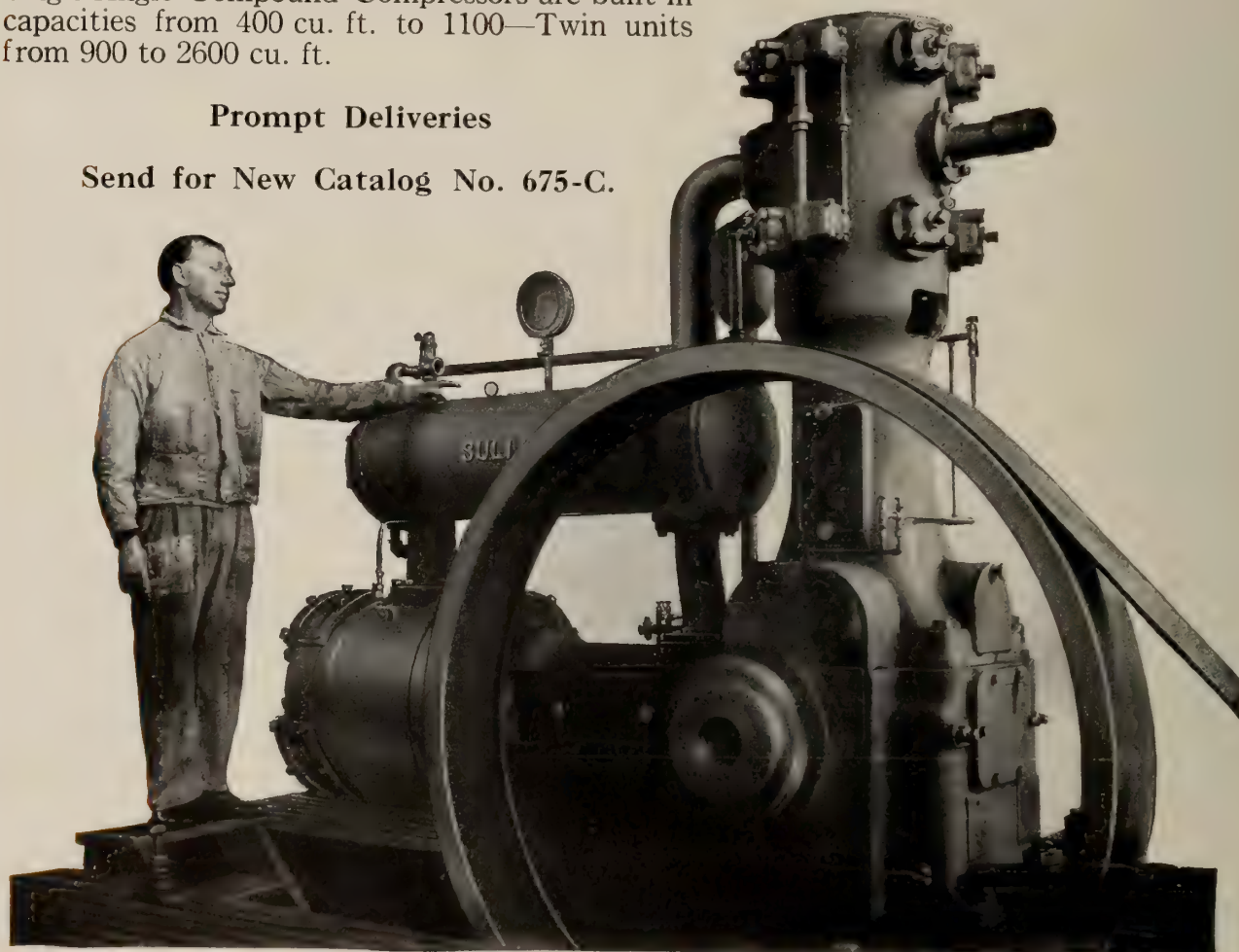
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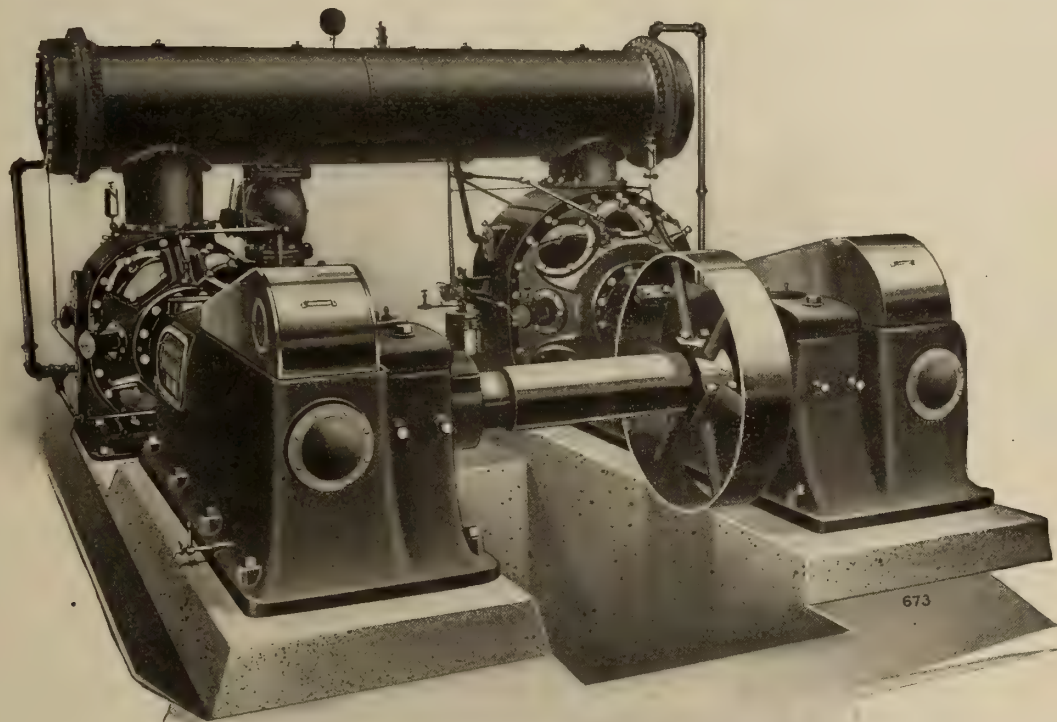


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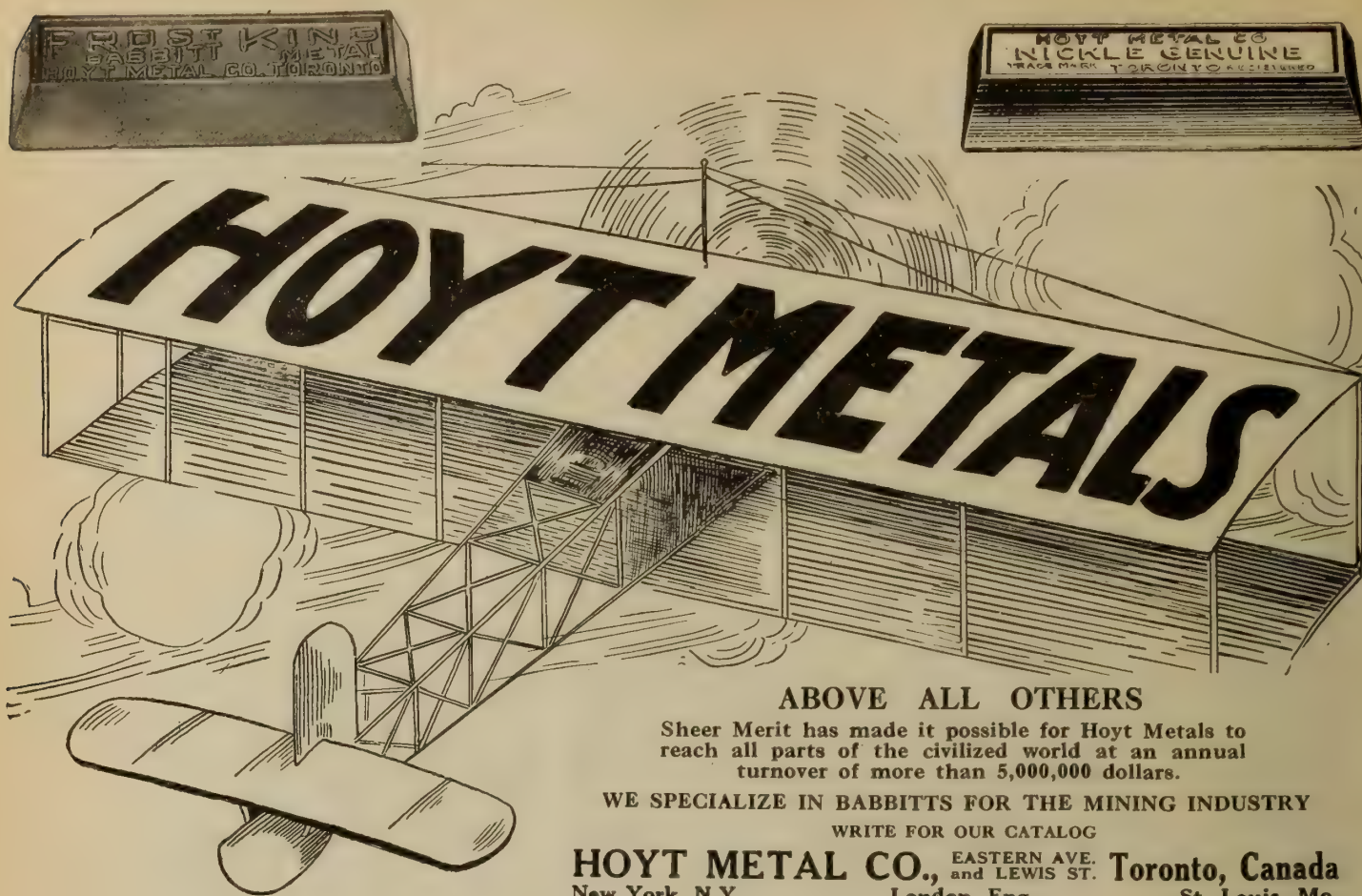
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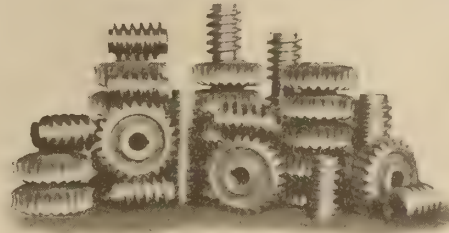
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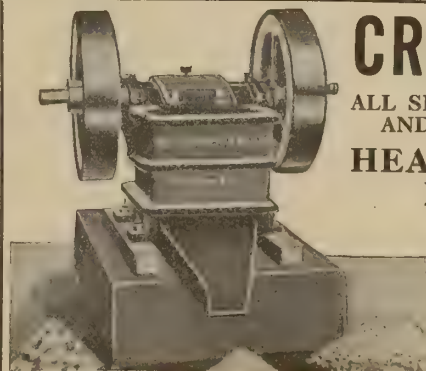
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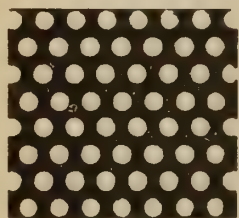
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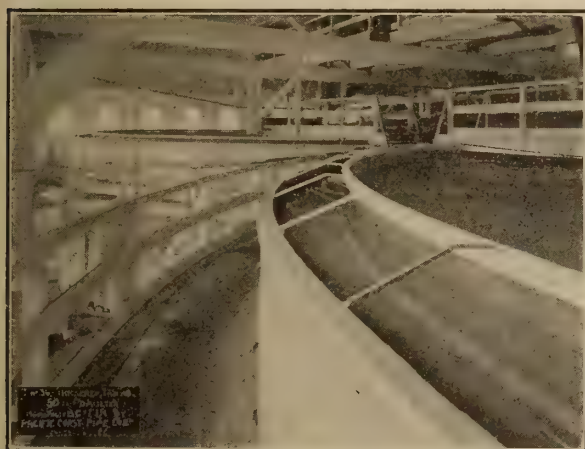
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WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

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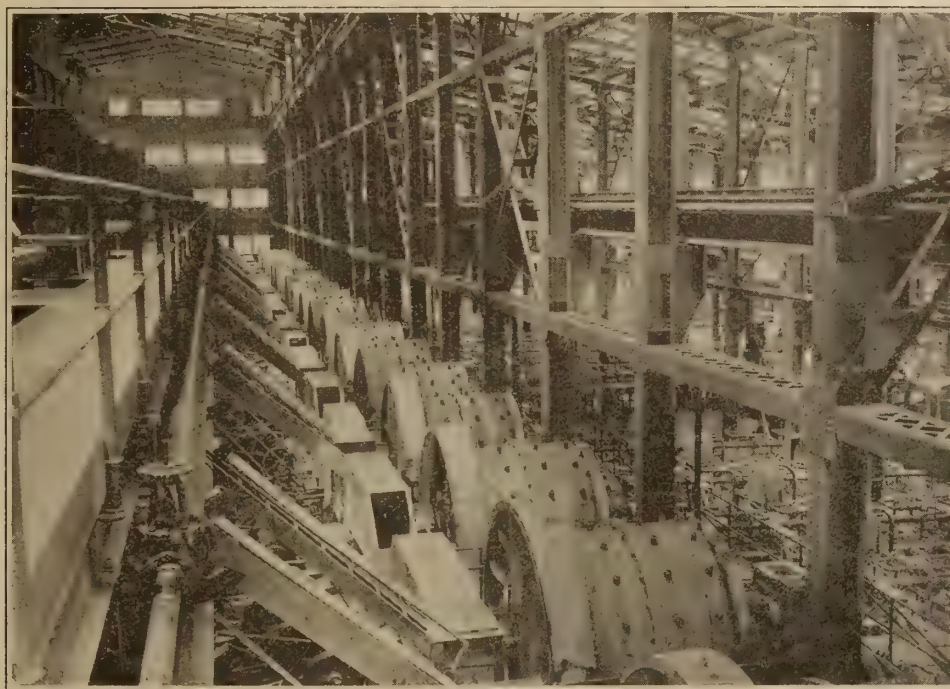
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, May 15th, 1918.

No. 10

The Canadian Mining Journal

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Coal mine operators are beginning to realize that coal has been selling too cheaply. This is a good thing for both mining company shareholders and employees, for so long as the product sells at prices that have ruled during the last decade there will be very little profit in the business and great difficulty in increasing wages of employees. If, in the future, coal is sold at a reasonable price, the wages of coal miners will undoubtedly be higher. At the same time shareholders will have some chance of obtaining a fair return on the money invested.

Nova Scotia is consuming much larger quantities of coal than usual and producing less. Consequently there is little coal available for Quebec; but there seems to be difficulty in obtaining transportation for what can be shipped.

THE GOLD MINING INDUSTRY AND THE WAR.

In this issue we publish an article on gold by Mr. Hennen Jennings, consulting engineer of the U. S. Bureau of Mines. Everyone employed in the gold-mining industry should read Mr. Jennings' article, for it will help them to realize that, in adding to our gold supply, they are doing very necessary work during the war.

It has been argued by some that the mining of precious metals during the war is an unnecessary waste of labor. Such a distinguished economist as Prof. Adam Shortt, in the first year of the war, made a good argument in favor of restriction of gold output. Then, when the United States entered the war, there was some discussion of this subject in the technical press. The arguments are well replied to by Mr. Jennings, an acknowledged authority on gold, who points out that gold will continue as the standard only if it is kept alive by continual new supplies. That it is to the interest of the Allies to maintain the gold standard is obvious, when we remember that nine-tenths of the production is controlled by the Allies. Increased gold production during the war will benefit the Allied countries, and it would be folly to devitalize a standard of exchange that is so favorable to us.

Unfortunately, it is true that a period of high prices is not the most favorable time to mine gold. While the product sells at the same price as in periods of low prices, the cost of production is very much higher. Owners of gold deposits have had good reason to consider whether they would not profit more by closing down until conditions become normal again. If they had only themselves to consider, it is not improbable that many directors would be in favor of closing down during the war. Some of them would doubtless believe that in doing so they were not only conserving their ore until they could mine it more cheaply, but that they were actually helping their country by releasing labor. They probably have not seriously considered what it would mean if the Allied countries were to severely decrease their output of gold and so discredit the gold standard. We can scarcely expect that, as individuals, they would worry very much about it. They doubtless expect, and they have a right to expect, Government action in such matters.

Gold mine operators are, of course, finding it impossible to make normal profits during the war. If it were realized that gold production at this time is especially necessary, possibly some encouragement might be given the industry. Is it to be expected that a great effort will be made to increase production of gold in the face of increased costs, if there is no proper recognition of the fact that such increase benefits the country more than it does the mine owners?

Encouragement to gold mining companies at this time should not be withheld. Our Governments would do well to consider whether it is good policy to tax an industry of this nature during the war on the same basis as industries which are benefited by the war. Those who are making large profits from the industry expect to be taxed, but it should be recognized that there are no war profits in gold mining.

THE SHORTAGE OF LABOR IN NOVA SCOTIA MINES.

Last July, coal mine operators of Nova Scotia submitted to the Fuel Controllers an estimate of 5,950,000 tons as the probable output of Nova Scotia coal mines in 1917. The production was 290,000 tons less than estimated. Increasing scarcity of labor and two disastrous mine explosions were the chief reasons for the failure to make the estimated output.

The coal operators now estimate that with their present supply of labor the mines should produce 5,430,000 tons in 1918 or 230,000 tons less than the unsatisfactory total of 1917. As, however, there will be further calls on the younger men as a result of the Amendments to the Military Service Act, it is probable that the labor supply will be even worse than at present and that consequently the production will be even less than estimated.

According to the operators, there is little reason to hope for many additions to the forces in the mines as there is no known source in Canada from which they might be obtained. Since this is the case, there seems to be especial need of increasing the tonnage per man employed. The operators suggest that an appeal should be made to the workmen to do more than the customary amount of work because of the pressing national necessity. They have suggested to the government that Mr. J. C. Watters should visit the mining centres and take up this matter with the miners as being one of great national importance.

It is reasonable to expect that an appeal to the workmen would have a good effect. The coal miners have, as a class, proven very ready to fight the nation's battles at the front and those at home may be depended on to do their part if the need for extra exertion is understood by them. There must, of course, be adequate compensation for extra work. It is up to the operators to do everything possible to increase the number of tons per man without increasing the consumption of human energy. It is also obvious that if coal mining is so important as we believe it to be, coal miners should receive better wages than they have in the past.

It has been announced that Canada will receive the same treatment from the Fuel Administrator of the United States as though Canada were part of the United States. In that case there will be no shipping of coal to parts of the country which should and can get their supply locally.

GEOLOGICAL REPORT ON METACHEWAN GOLD AREA.

There will soon be published by the Ontario Bureau of Mines a report, by A. G. Burrows, on the Metachewan area, in which important gold discoveries were made last year. Four townships are covered by the report. The Otisse claim in Powell township is to be thoroughly tested this summer and the surrounding country will likely be the scene of considerable activity. Mr. Burrows' map and report will, therefore, be of immediate value to prospectors.

Why Coal is Imported Into Western Canada

In the discussions of a paper at the annual meeting of the Canadian Mining Institute, Mr. G. G. S. Lindsay said, in part:

"Why is this large quantity of bituminous coal imported from the United States? Because it pays the railways to so direct it. The empty car movement from the head of the Great Lakes is westward. The full car movement to the head of the Great Lakes is eastward, and everybody who has had any experience in practical mining and in the handling of coal in Western Canada knows that the difficulties in connection with the marketing problem are those of transportation, namely, adverse freights and shortage of cars. In other words, the question is one of replacement. What produce or goods can the railways carry westward in the place of the imported bituminous coal? I would urge on those who seem to have this problem so much at heart that they should consider it from that standpoint. There are a very great many kinds of coal in the Canadian West. They range from inferior lignite in Saskatchewan to the very highest grade of bituminous coal obtainable in America, and the grade improves steadily as you approach the summit of the Rocky Mountains. In Saskatchewan, the coal is of the poorest grade, while that mined at the summit of the Rocky Mountains is the best, and will compare favorably with the very best coal that obtains in the bituminous field of this Continent. These coals will stand transportation, and they make very little slack; what slack they do make can very profitably be converted into coke, and there is a market for every ton of such coke. Why, then, do we bring coal to the prairie provinces from the United States, when in our own country we have a better coal that we might deliver to that Canadian market at a lesser cost? The freight rate from the summit of the Rocky Mountains to Winnipeg is \$4.50, and with the price of coal at \$3, it could be laid down in Winnipeg for \$7.50; and at intervening Saskatchewan and Manitoba points at less prices, depending on freight rates, and this, moreover, is a better coal than can be obtained from the United States for the same money. Why, then, is not that market open to Canadian producers? The answer is, because it has not suited the railways to favor it for the reason already mentioned that the empty car movement is westward and the full car movement is eastward. As to the proposal to briquette the inferior lignite coal of Saskatchewan to replace what represents a comparatively small proportion of imported anthracite, this expedient, it seems to me, is needless if, as I have suggested, high-class bituminous coals from Western Canada are made available in the market referred to at a lesser price than either anthracite or the proposed manufactured fuel.

Dr. W. G. Miller, Provincial Geologist of Ontario, has been asked to represent Canada on the advisory board of the Imperial Mineral Resources Bureau.

TUNGSTEN ORE FROM CARIBOO DISTRICT, B.C.

Mr. J. A. Macpherson, of the Cariboo Chisholm-Creek Mining Co., reports that he is operating, in a small way, scheelite deposits in the Cariboo district. The ore will be hand picked. A specimen of the ore may be seen at the office of the Canadian Mining Journal, Toronto.

The Gold Industry and Gold Standard

By Hennen Jennings.*

Gold attracted the attention of primitive man by its color, lustre and indestructibility. The earliest mining and metallurgical operations of which traces remain were those in Egypt that dealt with the ores of gold. From pictorial rock carvings in upper Egypt, as also from Egyptian hieroglyphics, it is found that the search, desire and use of gold extended back some 3,000 to 4,000 years before the Christian era.

Gold the Trading Counter.

Starting with use as an ornament, gold soon became the trading counter and has been an emblem of value to the human race as far back as history extends. Appreciation of the value of gold has been maintained through the centuries by the difficulties connected with obtaining the metal.

With early primitive methods, only the gold most abundant and easily worked and visible was first sought and this was found principally in alluvial deposits, but as knowledge, mechanical skill and tools and appliances were developed by the human race gold mining was extended to more difficult alluvial, vein, and lode deposits.

Gold, when it became the counter of trade and a measure of possession, was the most eagerly sought of all possessions, and thus it became the pioneer and stimulant in mining, metallurgy and chemistry. The search for this precious metal became so intense that the alchemists sought its transmutation from other metals, which, though they failed to accomplish, won them other knowledge and gave birth to chemistry.

The trading value of gold has been stabilized by history in that no superabundance was ever obtainable and it has always been necessary to expend labor and intelligence to an extent largely commensurate to the bartering value of the gold obtained.

Accurate records do not exist of the actual outputs of gold in early times, but certainly they must have been small from a modern standpoint. Great outputs of gold, as of all other minerals, are a matter of recent times.

It has been officially estimated that the world production of gold since the discovery of America, in 1492, to the end of 1916, a period of 424 years, was \$16,601,641,319. The output since 1894, a period of 23 years, was approximately \$8,500,000,000, or slightly more than 50 per cent. of the total amount mined in 424 years. The average yearly production up to 1894 was \$19,107,644, while, since 1894 to date it has averaged \$369,565,217 per year.

The available gold on hand as gold reserve in 1894 has been estimated at \$3,965,900,000. The loss of gold and its absorption in the arts and manufacture of jewelry accounts for the differences between the amount produced and the amount on hand.

The amount of gold used in the arts has increased since 1894, and of late years it has been between \$50,000,000 and \$100,000,000 a year. Estimating the consumption and loss of gold since 1894 at \$2,000,000,000 the amount of gold at present on hand as gold reserve may be roughly estimated at \$10,500,000,000.

The concentration and portability of this wealth can be appreciated by converting it into tons weight, for the total tonnage of the entire gold reserve of the world

does not amount to over 17,000 tons and it could be easily transported around the world in one of the largest steamships.

Gold, as also silver, has advantages as money counters owing to large value in small volume, ease of transportation, divisibility without loss, beauty, brilliant lustre, great durability, ease with which they can be guarded, and the difficulty of counterfeiting.

The province of the various mints of the world is to give guarantee of the weights and fineness of the gold they coin. The United States dollar contains 23.22 grains of gold and 2.58 grains of alloy, making a total weight of 25.8 grains, or 1.677 grammes, and its fineness is 900. Gold coins of all nations, under normal conditions, are exchangeable on the basis of their fine gold content.

A broad outlook on modern mining and a study of the output curves of metals since the discovery of gold in this country, in 1849; Australia, 1851; and Transvaal, 1886—indicates that big mining is surprisingly modern and that great outputs of other minerals have been pioneered by gold. Until the last few years, gold outputs have shown a parallelism with those of coal, iron and copper; with the growth of railways and the deposits in our banks. It would seem that the outputs of coal during the last 18 or 20 years; iron, 15 years; copper, 13; and petroleum, 11—were greater in aggregate than the output of these minerals for all previous history.

The mineral outputs of modern times have been possible only by the advances made in invention, engineering, chemistry and business organization. Even so, it would now appear that the gold output of the world has about reached its zenith, and is giving indications of future decline, as shown by the returns for the past ten years, as under:

1908, \$442,476,900	1913, \$459,941,100
1909, 454,059,100	1914, 455,705,000
1910, 455,239,100	1915, 468,724,918
1911, 461,939,700	1916, 457,006,045
1912, 466,136,100	1917, 430,000,000 (est.)

The extreme variation of outputs during this period is given in percentages for the pre-war year 1913, and drop of 6 per cent. is seen from the previous year.

The gold production table appended gives the gold returns from all countries of the world from 1912 to 1916, inclusive, with relative percentages for the pre-war year 1913.

The table shows that gold has been mined in about 60 different countries, and in all the continents of the world. It has been found in the oldest rocks and thus in almost all subsequent geological formations. Traces of gold have been proven to exist in sea water, so the distribution of gold is most widely spread, but never in great quantity compared to other metals. Exceptional occurrence and favorable natural and commercial conditions are required for its profitable extraction.

The Gold Producing Countries.

The relative production of gold from all countries is given in percentages in the pre-war year 1913, and on a war basis they can be classified as, Allies, Central Powers, and Neutrals, with percentages as follows: Allies, 91.3 per cent.; Central Powers, .6 per cent.; Neutrals, 8.1 per cent. Of the Allies, it is seen that Great

*Consulting Engineer of the United States Bureau of Mines.

WORLD'S PRODUCTION OF GOLD, 1912 TO 1916, INCLUSIVE.

(Compiled from the reports of the Director of the Mint, U.S. Treasury Department.)

	1912	1913	Per Cent.	1914	1915	1916
NORTH AMERICA:						
United States.....	\$93,451,500	\$88,884,400	19.3	\$94,531,800	\$101,035,700	\$92,590,30
Canada.....	12,648,800	16,598,900	3.6	15,925,000	18,977,901	19,234,97
Mexico.....	24,500,000	19,308,800	4.2	19,308,800	6,559,275	7,690,707
Central American States.....	3,030,400	2,721,700	.6	2,293,800	2,970,271	3,517,597
SOUTH AMERICA:						
Argentina.....	107,300	2,600	.0	2,600		6,330
Bolivia and Chile.....	175,000	175,000	.0	175,000	814,418	396,922
Brazil.....	3,570,600	2,254,700	.5	2,698,200	2,424,515	2,424,515
Colombia.....	2,971,700	2,971,700	.6	4,678,600	5,453,148	6,173,867
Ecuador.....	406,500	406,500	.1	406,500	455,674	545,674
Peru.....	492,200	492,300	.1	492,300	1,109,891	1,179,537
Uruguay.....	111,000	29,900	.0	29,900	11,836	11,836
Guiana—						
British.....	879,800	1,353,500	.3	1,126,500	923,892	767,525
Dutch.....	407,300	470,400	.1	503,400	449,054	438,223
French.....	3,050,600	3,050,600	.7	3,050,600	1,959,793	1,959,793
Venezuela.....	623,500	444,800	.1	444,800	1,395,349	1,424,930
EUROPE:						
Austria-Hungary.....	2,043,200	2,179,300	.5	2,179,300	1,392,465	1,392,465
Finland.....		900	.0	900		
France.....	1,812,100	2,127,400	.5	2,127,400	1,400,000	1,000,000
Germany.....	78,100	135,600	.0	135,600		
Great Britain.....	27,800	17,900	.0	17,900	19,266	19,152
Greece.....			.0			
Italy.....	11,000	17,200	.0	31,100	2,295	2,295
Norway.....			.0			
Portugal.....	2,300	2,300	.0	2,300	661	661
Russia.....	22,199,000	26,507,800	5.8	28,587,000	26,322,746	26,322,746
Servia.....	251,100	328,000	.1	116,000		
Spain.....			.0			
Sweden.....	20,300	17,600	.0	17,600	25,323	25,323
Turkey.....	500	500	.0	500	475	
AUSTRALIA:						
British New Guinea.....		377,200	.1	377,200		
New South Wales.....	3,416,900	3,093,200	.7	2,573,800	2,738,958	2,235,556
Northern Territory.....	110,300	64,500	.0	52,300	20,351	17,281
Queensland.....	7,192,700	5,493,200	1.2	5,134,800	5,161,911	4,447,793
South Australia.....	136,300	135,500	.0	129,200	125,701	86,399
Victoria.....	9,925,200	8,990,800	1.9	8,541,900	6,803,359	5,305,282
Western Australia.....	26,514,900	27,165,700	5.9	25,487,800	25,104,928	21,941,044
New Zealand.....	6,428,100	7,102,700	1.5	3,870,700	8,740,567	6,048,992
Tasmania.....	785,000	690,400	.2	542,500	383,402	326,408
ASIA:						
British India.....	11,055,700	12,178,000	2.6	11,378,400	11,522,457	11,206,509
China.....	3,568,900	3,658,900	.8	3,658,900	2,804,692	2,804,692
Chosen (Korea).....	2,852,600	3,582,500	.8	3,306,700	3,739,477	4,122,351
East Indies—						
British.....	1,352,000	1,352,000	.3	1,352,000	3,100,000	3,100,000
Dutch.....	3,387,100	3,387,100	.7	3,387,100		
Federated Malay States.....		282,400	.1	269,100	351,527	327,871
Formosa (Taiwan).....		814,600	.2	814,600	1,143,017	1,001,178
Indo-China.....	74,700	74,700	.0	74,700	43,659	65,620
Japan.....	4,467,000	3,614,400	.8	3,614,400	5,380,066	5,386,066
Siam.....	56,500	56,500	.0	56,500		
AFRICA:						
Abyssinia.....		497,200	.1	497,200		
Belgian Congo.....		916,600	.2	916,600	1,029,189	1,029,189
Egypt.....		95,100	.0	126,800	144,910	144,910
French Colonies.....	2,044,600		.0			
French East Africa.....			.0		43,414	43,414
German East Africa.....		253,200	.1	253,200		
Madagascar.....		1,256,200	.3	1,075,900	1,381,354	964,980
Rhodesia.....	14,226,900	14,274,700	3.1	17,423,100	18,915,324	19,232,165
Sudan.....		192,700	.1	242,800		
Transvaal, Cape Colony and Natal.....	188,293,100	181,885,500	39.5	173,560,000	188,043,156	192,182,902
West Africa (Nigeria, Gambia, Gold Coast, and Sierra Leone).....	7,286,000	7,955,300	1.7	8,075,100	8,304,551	7,860,079
Total.....	\$466,136,100	\$459,941,100	100.00	\$455,676,600	\$468,724,918	\$457,006,045

NOTE.—The percentages given are based on the 1913 production with normal mining conditions, when the Allies produced 91.3 per cent.; the Central Powers .6 per cent., and the Neutral countries 8.1 per cent.

Britain, with her colonies and dependencies, produced 62.6 per cent.; United States, 19.3 per cent.; and Russia, 5.8 per cent.

The main gold producers of the world rank in order thus: Transvaal, United States, Australasia, Russia, Canada, and Rhodesia.

Australasia's gold output from 1851 to 1903 amounted to approximately \$2,060,000,000. The output in 1903 was about \$87,000,000 and since then production has decreased gradually until in 1916 it amounted to only about \$39,000,000, or 45 per cent. of the production in 1903. There is at present no indication of any large increase of output in the future.

The Canadian gold output was very small in 1891, but mounted rapidly until 1900, when the Yukon placer workings seemed to have reached their maximum; in that year the Canadian fields produced \$28,000,000. Since 1900 there has been a fluctuating downward tendency. The years 1915 and 1916, however, show some increase; the production for 1915 being \$18,977,901

and that for 1916, \$19,234,976. The war conditions are unfavorable for exploitation or search for new discovery. The extent of territory and natural conditions are such, however, as to give hope of future greater outputs.

Russia's gold statistics are open to doubt. It would appear that gold has been worked in the Ural district since 1820 and that in the last 12 or 13 years outputs have varied from \$35,000,000 to \$22,000,000 a year. Some engineers express the belief that Siberia has greater possibilities for future discovery and exploitation of gold, as also of other metals, than all other fields in the world. At present, in view of war and industrial conditions, the prospect of large outputs of gold in the immediate future is uncertain.

Of the South American and Central American fields, Mexico is the most important. The revival of gold mining commenced with a very small output in 1890 and the maximum production was reached in 1911 with an output of \$29,200,000. Owing to the revolution in that

country the output has dropped to \$7,690,707 in 1916, which was a million dollars increase over 1915. When the country is in better political and economical condition there is good ground for hoping for increased returns.

In other sections of Central and South America the outputs have not been large, but there yet remain large stretches of unexploited territory and abandoned properties which may be found profitable to work.

Gold Mining in the United States.

The total production of gold in the United States has been given by the Director of the Mint, as under:

From 1792 to 1847	\$ 24,537,000
From 1848 to 1872	1,204,750,000
From 1873 to 1916	2,599,670,200

Total \$3,828,957,200

THE WITWATERSRAND GOLD MINING INDUSTRY'S PROGRESS.

Year	Tons Milled	Total lb	Yield Per ton s. d.	Working Costs Total lb	Per ton s. d.	Dividends lb	Year
1887.....	25,000	81,045				12,976	1887
1888.....	250,000	729,715				109,050	1888
1889.....	575,000	1,300,514				430,666	1889
1890.....	702,825	1,735,491	49 4	1,480,940	42 1½	254,551	1890
1891.....	1,175,465	2,556,328	43 5	2,221,630	37 10	334,698	1891
1892.....	1,921,260	4,297,610	44 7½	3,418,290	35 6	789,320	1892
1893.....	2,215,413	5,187,206	47 0	4,231,848	38 4	955,358	1893
1894.....	2,830,885	6,963,100	49 2	5,435,816	38 4	1,527,284	1894
1895.....	3,456,575	7,840,779	45 4	5,793,927	33 5	2,046,852	1895
1896.....	4,011,697	7,864,341	39 3	6,350,659	31 7	1,513,782	1896
1897.....	5,325,355	10,583,616	39 7	7,876,435	29 6	2,707,181	1897
1898.....	7,331,446	15,141,376	41 3	10,293,138	28 0	4,848,238	1898
1899.....	6,639,355	14,093,363	42 3	11,606,968		2,946,358	1899
1900.....	692,413	2,484,247		2,590,523			1900
1901.....	412,006	1,014,687	49 2½	598,874		415,813	1901
1902.....	3,416,813	7,179,074	42 0	5,057,948	25 9	2,121,126	1902
1903.....	6,105,016	12,146,307	39 8	8,800,805	24 9	3,345,502	1903
1904.....	8,058,295	15,520,329	38 6	11,664,359	24 4	3,855,970	1904
1905.....	11,160,422	19,991,658	35 10	15,237,309	23 6	4,754,349	1905
1906.....	13,571,554	23,615,400	34 6	18,049,431	33 2	5,565,969	1906
1907.....	15,523,229	26,421,837	33 11	19,499,417	20 10	6,922,420	1907
1908.....	18,196,589	28,810,393	31 5	20,273,720	18 0	8,536,773	1908
1909.....	20,543,759	29,900,359	28 11	21,361,891	17 1	9,471,391	1909
1910.....	21,432,541	30,703,912	28 6	19,487,807	17 7	8,876,085	1910
1911.....	23,888,258	33,543,479	27 11	22,127,618	18 0	7,763,086	1911
1912.....	25,486,361	37,182,795	29 0	24,504,700	18 8	7,952,994	1912
1913.....	25,628,432	35,812,605	27 9	22,919,871	17 11	8,194,099	1913
1914.....	25,701,954	34,124,434	26 6	21,943,692	17 1	8,073,436	1914
1915.....	28,314,539	37,264,992	26 3	24,657,659	17 5	7,519,416	1915
1916.....	28,525,252	38,107,099	26 8	25,763,270	18 1	7,095,066	1916
Total.....	313,117,709	lb492,198,901		lb343,248,445		lb119,029,709	

Official Statistics Showing Annual Tonnage Milled, Value of Output, Working Costs and Dividends.

The Gold Mining Industry of the Transvaal.

The preceding tabulated statement for the Transvaal is given in full as it is the most complete record of gold mining operation in the world. The yields, working costs and dividends, from 1887 to 1916, a period of 30 years, have been obtained by sworn statements to both Boer and British Governments.

The total output for these 30 years was £492,198,901, or about \$2,300,000,000. The yearly return for 1916, was £38,107,909, or about \$185,000,000, which was 40 per cent. of the world's output for that year. The dividends amounted to 24 per cent. for the whole period, but only 18.6 per cent. for the years 1915 and 1916.

There has been a great struggle to lower expenses, which have been reduced from 42 shillings to about 17 shillings per ton. The average yield has been downward, and fell from 49 shillings to 26 shillings. It would seem the Transvaal fields have reached their maximum output and are on the down-grade.

The Rand Gold Mines are greatly favored in the fact that coal is found in close proximity to the gold. Also, native labor has been moderate in its wage demands, and outnumbers the white workers nearly 8 to 1, thus allowing skilled white workers opportunity for generous pay, which they have obtained.

The existence of gold in Rhodesia has been known for many years but material gold returns only started in 1898, and have steadily increased until 1916, when the output amounted to over \$19,000,000. There was a falling off, however, in 1917, of nearly two million dollars. The total production from 1898 to 1917, inclusive, amounted to \$194,672,165. At the present time the output is depressed by labor and supply conditions, and although the territory for mining operations is vast, with still unknown possibilities, there have been no new discoveries of late.

The yield up to 1847 was obtained from the Eastern coast; from 1848 to 1872, largely from the placer mining in the West; and from 1873 to date, by combination of placer and lode mining and recovery of gold from refineries.

Gold dredging in the United States dates only from 1896, and since that date the production of gold has been estimated at \$120,103,117.

In 1916 the greatest amount of placer mining, including dredging, was done in Alaska, where over 60 per cent. of the gold was thus recovered, and in California, where 38 per cent. was recovered.

All of the gold mining corporations of the United States do not make public their yields, costs, or profits, as is the case in the Transvaal. This government does not make demand for such information. Some of the largest and best managed, however, give most complete and generous information, which can be found in the transactions of mining societies, mining journals and handbooks. There would appear to be no reason for secrecy in gold mining returns, as it is the one business in the world that does not face competition in marketing its product.

Lode or quartz mining in the United States and Alaska produces 75 per cent. of their output. For the world, the percentage is much greater. In South Africa practically all the output is from this source, and shafts as deep as 5,000 ft. have been sunk on the Rand to develop the conglomerate deposits.

In the United States, lode mining has been conducted in great variety of formations and deposits varying from narrow veins of banded quartz with high per ton yield, to great irregular masses of low-grade ore. The gold is often associated with tellurium and other minerals. When pay has given out at shallow or moderate depths, explorations to depths of 4,700 feet, or over, have very often been justified.

The treatment of the ores depends upon their richness and association with other minerals, and the processes for recovery mostly in use are the jaw and gyratory crushers, for the larger rocks, followed by stamp mills, ball mills or rolls, for finer crushing, then plate amalgamation, by which in certain ores the greatest gold return is obtained; and concentration by vanners, shaking tables or oil flotation devices. The concentrates are treated by smelters, chlorination or cyanide works. After stamping or amalgamation the whole pulp is often economically treated in bulk by cyanide process.

Yields and Costs.

The yields and costs vary in different districts and in different mines in each district. The greatest gold producers have been mines of low or moderate yield per ton, but with great mass occurrence and good conditions for economical working. The best example of such mining is the Homestake Mine in South Dakota, which has been working since 1875, and has produced over \$147,000,000, the ore not averaging over four dollars a ton and costs ranging from 2½ to 3 dollars per ton with dividends \$40,000,000 or 27 per cent. of the output.

The records of the Alaska Treadwell Group of Mines started in 1885, and brought up to June, 1916, showed there had been crushed and treated 26,000,000 tons, yielding \$63,000,000 or \$2.37 per ton, and at a cost of \$1.42 per ton. The workings were extended to a depth of 2,300 feet, some of them were under the sea and the majority of the mines were flooded with water on April 21, 1917, and are now closed.

Lower yields and lower costs have been obtained by the Alaska Juneau Company and the Alaska Gold Mines which are only a few miles distant from the Alaska Treadwell Mines. Working on a large scale has only been started at these mines recently. In 1916 the Alaska Gold Mines crushed nearly 2,000,000 tons, giving a yield of 97 cents and at reported costs of 73 cents. The Alaska Juneau's large mill has only recently been put into operation. It is anticipated their yields and costs will be still lower. These are the lowest yields and costs known in gold mining. Hydro-electric power is used and all natural conditions ideal for cheap working.

The Mother Lode.

The Mother Lode in California, on which a 10-stamp mill was started in 1852, has been prospected or worked over an area of 125 miles, and has produced, according to estimates, over \$230,000,000 in gold. At two of the mines, shafts have been sunk to vertical depths over 4,000 feet. Many mines, however, have been abandoned at moderate depths owing to failure to make them pay. The early returns per ton from the Lode were much higher than recently, which do not average over \$4 per ton. Some old abandoned mines have lately been opened up again and by hydro-electric power and better system of mining and management made to yield substantial profit.

A notable case is that of the Plymouth Consolidated Mines, in Amador County, on the Mother Lode, reopened after an idleness of 24 years, liberally equipped by capital and costs reduced to about \$3.00 per ton.

The North Star Mine, in California, is a good illustration of a persistent but narrow vein of quartz, worked under good management, and being made to pay moderate profit for a very long period. The mine was discovered in 1851, and since then to 1917 has produced 1,470,000 tons, yielding \$18,610,000, or an average yield

of \$12.66 per ton. The total dividends have amounted to \$5,137,000 or about 35 per cent. of the yield. The returns for 1916 show a yield of \$10.42 per ton, with costs at \$6.26 per ton.

An example of very rich yield, but with short life, is found in the case of Gold Fields Consolidated Mines, Nevada. Here, within eight or nine years \$50,000,000 have been taken out, but the yield has fallen from 38.50 a ton in 1910 to 7.52 in 1916. The costs must have been moderate on account of the magnitude of the lode.

The Portland Mine, in Colorado, is another rich telluride mine. It has produced over \$40,000,000 with an average yield of \$27 per ton. The dividends, however, have not amounted to over 20 per cent., as a great amount of development, dead work and costly mining and reduction have been necessary.

Effect of Present Economic Conditions on Gold Production.

The writer was in California and Montana in December, 1917, where he had an opportunity of discussing with a number of operators, managers, and engineers the effect of the present economic conditions on the future output of gold as also the proposed excess war profits tax.

As labor and supplies go up, so must the cost of winning gold be increased, and the purchasing power of gold decreased. An index as to the decreasing purchasing power of gold is obtained by noting some of the increases in cost of supplies used in its obtainment, some of which are given in the table below.

The advance in costs of hydro-electric power has been small. The cost of coal and petroleum varies in different localities, but where necessary to use, is a serious advance in cost of operations under power cost.

ADVANCE IN THE COST OF MINING GOLD.

Labor (about)	20%
Steel (in California)	40 to 280%
Manganese steel (largely used in dredging) ..	130%
Explosives	75%
Quicksilver	93%
Lumber	125%
Machinery, etc.	75%
Miscellaneous	10 to 200%

Some companies with liberal margins between profit and loss can continue to work under present, or even much worse labor and supply conditions, but the excess war profits tax may so operate as to induce them to curtail outputs. Some of the mines working on very small margins are being closed down gradually and others may be kept going for a time by reducing development work and up-keep of plant, and generally marking time while hoping for better future conditions. There has been a fear among operators that through the workings of the Priority Board there may be difficulty in obtaining transportation and other necessities to keep their mines in constant operation.

It is my view that the elimination of all excess profit taxes on gold mining and the encouraging of maximum outputs might in reality bring in greater revenue to the Government than the tax; for larger dividends paid to shareholders would mean greater revenue from individuals.

Gold Standard.

Almost all countries of the world have as their financial basis the legal standard of gold. Only a few retain the double standard of gold and silver—Italy alone among the combatants.

Prior to the war, while there was freedom in trade and inter-communication between the different coun-

tries, the prices of various commodities were regulated both from within and without by the operation of the laws of supply, demand, and competition, and stabilized by the intrinsic value of gold.

The debts of the principal belligerents at the time of their entering the war and those contracted since their entrance, as also an estimation of further debts per year, are given in a very rough and approximate manner in the table hereunder. They are sufficiently accurate, however, to illustrate the danger of the world's financial situation.

DEBTS OF PRINCIPAL BELLIGERENTS.

Allies:	Pre-War	War	Total to Dec., 1917	Future yearly estimate
Great Britain.....	\$3,500,000,000	\$23,350,000,000	\$26,850,000,000	\$6,700,000,000
France.....	6,346,000,000	11,754,000,000	18,100,000,000	4,400,000,000
Russia.....	4,544,000,000	16,300,000,000	20,844,000,000	5,000,000,000
Italy.....	2,900,000,000	6,300,000,000	9,200,000,000	2,500,000,000
United States.....	1,200,000,000	7,000,000,000	8,200,000,000	14,000,000,000
Total.....	\$18,490,000,000	\$64,704,000,000	\$83,194,000,000	\$32,600,000,000
Central Powers:				
Germany.....	\$5,000,000,000	\$20,650,000,000	\$25,650,000,000	\$6,000,000,000
Austria-Hungary.....	4,000,000,000	12,200,000,000	16,200,000,000	4,000,000,000
Turkey and Bulgaria.....	800,000,000	1,100,000,000	1,900,000,000	350,000,000
Total.....	\$9,800,000,000	\$33,950,000,000	\$43,750,000,000	\$10,350,000,000
Grand Total.....	\$28,290,000,000	\$98,654,000,000	\$126,944,000,000	\$42,950,000,000

The table shows at a glance the great difference between the debts incurred by the Central Powers and those of the Allies. Taking into consideration the number of combatants and the necessary munitions and supplies used by them, is it not evident that the Central Powers are getting far more value for their debts contracted than the Allies?

As regards the stock of gold on hand in the world and the amount held by the United States, used as money and security, the following quotation is given from the Report of the Secretary of the Treasury, the United States, 1917, page 24, viz.:

"The gold monetary stock (coin and bullion used as money) in the United States on November 1, 1917, is estimated at \$3,041,500,000. The increase in the past 10 months has been \$174,500,000; in the past three years \$1,236,500,000; while in the past five years it has been \$1,161,333,000. In five years the portion of the world's gold monetary stock held by the United States has increased from approximately one-fifth to more than one-third."

This indicates that the calculation made previously in this paper of the gold reserve, corresponds closely with the estimate of the Secretary of the Treasury.

Accepting \$10,000,000,000 as the proper gold reserve of the world, it may be calculated that at the beginning of the war the gold reserve was 35 per cent. of the total debts of the belligerents, while at the present time, it is only about 8 per cent.

Gold Coins are Certificates from Nature of Man's Work.

When prices of labor and commodities are so advanced that it is not possible for the majority of the gold mines of the world to work at any profit, then labor and supply prices must become lower, or gold becomes automatically demonetized.

Gold coins can be considered storage cells of human energy, as to obtain them labor of hand and brain must be expended; in fact, they are thus charged with human electro-motive force. They are able to give out strong genial currents of trade confidence, circulating and binding trade, and bringing together different industries and peoples in different lands; their value is not founded on the fiat of any one or more legislative bodies of one or more countries that may be experiencing fleeting prosperity, but they are certificates from nature of man's work and accomplishment.

The electro-motive force of the storage battery cells depends not only on the amount of the electricity poured into them, but also its pressure or intensity. In electrical parlance, the rate of flow is known as the amperes and the pressure the volts, while the power, the watts.

In the gold cells filled with human energy, the amperes can be considered the number of workers and the volts the forces and tools placed at the disposal of the workers by discovery, science, and organization. The watts may be considered the labor force stored in the cell of coin.

In the mention of the labor elements poured into the cells, it must be understood that labor should include the work of managers, engineers, metallurgists, chemists, overseers, mechanics, and other skilled laborers, as well as the more unskilled work of drillers, trammers, shovellers, etc.

The electric storage battery of cells can be rendered useless or burnt up by excessive charges of current; they can also dry out and stop working, or be feebly active should there be an insufficient number of cells in the circuit to do the work demanded.

Translating these conditions to the human electro-motive coin cell, the value of gold can be destroyed by its too great abundance and its too great ease of obtainment. History is almost uncanny in showing how visions of super-abundance as seen or painted by owners and miners, have been doomed to disappointment, and how, considering time and averages, nature has demanded full toll in labor for her gold.

To Cut Off Supply of New Gold would Devitalize Coinage.

The electric storage cell can dry out and disintegrate unless refreshed with new current. Should the obtainment of new gold cease while drafts on the old coins are vastly increased, the whole storage battery of gold energy may get so out of adjustment as not to do useful work and gold would become demonetized and the accumulated labor energy of centuries past, locked up in old coins, become inert and valueless. Should all gold mining stop or very radically diminish, this would be the result.

As long as this country, or in fact any country, continues to measure values by a gold standard and pledge its credit on this basis, in the long run the cost of obtaining new gold supply must fix its limitations to the rise in wages and commodities. Gold is a sluggish governor and seems at times inoperative, but its plentifulness and cost of obtainment is ever operative, though not the only factor in the rise and fall of prices.

The great value of the gold coins is that they represent past labor achievements and can not be duplicated in the future without equivalent labor effort. Promissory bills or notes, or contingent division of profits made by either governments, banks or individuals, can be made mere scraps of paper almost overnight by war, revolution or commercial failure, but for thousands of

years gold, while showing fluctuation in purchasing power, has ever been valuable.

Our government securities and liberty bonds, pledged on a gold basis, take the place of gold coins only as long as the people in this and foreign countries have faith that the Government can make good its promises. When this is seriously doubted by the many, gold will go to a premium.

The great gold reserves of the past would not be so necessary if the recognition of the fundamental necessity of measuring gold values in units of labor necessary to win it were better recognized and insisted upon by governments that pledge their credit on a gold basis. Safely to lessen gold reserves while upholding the legal gold standard is the great financial problem of the day for this and other countries.

To attempt to adjust the value of the gold coin by changing its weight in fine gold by government fiat, would be to take away all intrinsic merit from the gold standard and result in confusion and utter lack of financial faith and confidence.

The temptation to enlarge obligations and thus reduce gold reserves to an inadequate amount and meet the difficulty by refusing to pay coin for gold pledges, also has great financial dangers.

The Functions of Money.

The conception and definition of money has been one of the most fruitful subjects of disagreement, argument and books known to man. It would seem, however, that the main functions of money are first, facilitating exchange; second, a means of estimating comparative values of commodities.

The unreality of paper money is forced upon the writer by his study of gold, the happenings of the time and the outlook for the future. Money must in a large measure be based on sentiment and good faith, for money, even including gold, has no intrinsic value except as an incentive or stimulant to future human enterprise, effort and labor. Its stored value vanishes when the mass of the people repudiate it. When faith in it gives out, those that may seize and wish to make new divisions will find only waste paper in the bonds, notes and securities so eagerly desired and coveted.

Money can be converted into reality only by working masses led by efficient officers, and who not only make use of the muscular energy of the masses, but harness into service all the impersonal obedient servitors that discovery, invention, science and engineering have placed at the command of man, and which force far exceeds all the muscular energy of man.

The payers of income tax in 1915 did not amount to more than one-third of one per cent. of the population. The envied rich amount to only a fraction of this number. They may enjoy pride of possession in the paper showings of their bank deposits and lists of securities, also the power it gives, but their absorbing power of that which money can really give to them individually is very small and confined largely to what they and their families can eat, drink and wear. All other possessions they must share or pass on to others.

The rich are merely deflectors, gates or valves in energy currents. The greatest wealth by the individual has been obtained by organizing labor and producing the necessities of the many at the lowest prices and taking small profits per unit, but with the greatest number of units.

As labor in its broader sense has been organized and stimulated to produce a maximum amount of commodities, it provides for its own necessities and comfort as well as that of the few and makes possible a greater

division of such commodities among themselves. Thus, great production is beneficial to the many as much, and in proportion more, than to the few.

The decennial census of 1910 shows that above 93 per cent. of the male population of the United States, over 21 years of age, is occupied in gainful pursuits. A far more difficult problem than the destruction of capital would arise among the workers should the present order of things be suddenly abolished, which would be how a fair, satisfactory, stimulating division of salaries and wages could be arranged and enforced among the workers, so that they would have more leisure and at the same time obtain more wants and necessities.

Any advance in wages of one class of workers must in fairness be followed by proportionate increases in the wages of other classes and as the laborer's wants and requirements for subsistence and comfort are dependable on his fellow-worker, so must the cost of his subsistence increase as his own and other wages are raised. Thus, in the end no material gain can be obtained by labor unless there is some corresponding advance in the output of his work.

The Government at the present time is the greatest employer of labor and purchaser of commodities. The danger of allowing the prices of commodities to rise above the future cost necessary for obtaining gold, it is hoped has been made plain. Certainly the Government should insist on the stoppage of all classes of profiteering, but how is it possible to fix prices of any commodity and make low bids possible unless there is some limit fixed upon wages and salaries?

The war must be won and it will take money as well as men to accomplish it. However, it does not help matters to pledge credit unnecessarily to please or placate either labor or capital, and the more we get for money on a gold basis at the present time the less will be the burden of debts incurred on future generations, which must of necessity be paid by the mass of the people rather than the few.

The Allies Must Uphold the Gold Standard.

The financial integrity of the country has been pledged on a gold basis. As 90 per cent. of the gold output of the world comes from the Allies' territories, as a war measure it is plain that it is to the advantage of the Allies to uphold the gold standard. For the past 10 years the world's yearly output of gold has been almost stationary, and the present high cost of labor and supplies are acting very seriously against any increased production.

To stop gold mining in a time of financial stress, as has been indicated, would be like closing the doors of a bank when a run is made upon it. It therefore must be evident that it is vital for this and all Allied countries to encourage gold mining as far as possible.

Gold Mining Should be Encouraged.

Unfortunately but little help can be directly extended to the gold industry, but, as far as possible, encouragement should be given, for while the war may have proved profitable to any other class of industry in the matter of earnings, certainly it has been seriously injurious to the gold industry.

Indirectly, the gold industry, as well as new issues of Government bonds, can be greatly helped by the reduction in prices of all necessary commodities, and this certainly should be seriously, judiciously and fairly taken in hand by the Government.

The war is to be won by the efficiency, harmony and morale of the workers behind the firing lines as much as by the exercise of these qualities by the soldiers at the front. The right conception of what gold, and in fact

money in any form, has the power of doing, or not doing, seems to the writer a matter of most vital concern at the present time. A better understanding of this problem, he believes, would tend to knit together governments, labor and capital and make for efficiency, harmony and happiness.

Gold Production in French Colonies

There has recently been published by the National Museum of Natural History, Paris, an interesting paper by Prof. A. Lacroix, entitled "Les Gisements de l'or dans les Colonies Francaises." In this paper Prof. Lacroix deals with statistics of production and the modes of occurrence of the metal in the various colonies of France. The statistics cover the production for the years 1902 to 1915, both inclusive. During this period the greatest production was in 1909, when gold to the value of approximately \$4,512,118 was exported from the colonies; the lowest was in 1914 when the value was \$2,732,807.

As Prof. Lacroix points out the French colonies occupy but a modest place as gold producers, but he believes that when the territories which they embrace are properly explored and prospected the output of the metal will be largely increased.

The French colonies may be divided into two great groups: (1) Martinique, Tahiti, etc., largely of volcanic origin and in which conditions for the occurrence of gold are not so good, and (2) those colonies which are made up largely of ancient rocks, Madagascar, French West Africa, Guiana and Indo-China among them furnish the gold production; but in very unequal proportions.

Gold was discovered in Madagascar in 1845. But, fearing the effects on the people of prospecting and working the deposits, the Queen, Ranavalona I., prohibited, under severe penalties, searching for the metal and this decision was strictly maintained until 1886. At the latter date the prohibition was removed and certain mining concessions were granted. French occupation in 1896 gave an impetus to prospecting. The year of greatest gold production since then was 1909 when about \$2,040,000 was exported. In 1913 the output was about \$1,139,000.

In French West Africa the auriferous areas are numerous, but up to the present production has been small. Among the territories in which gold has been found are those of Senegal-Niger, Guiana and the Ivory Coast. In 1915 the gold exported from these colonies amounted to about \$109,500.

Guiana is the largest gold producer of the French colonies. In the period since 1900, the year in which there was the largest export was 1908, when it amounted to \$2,400,000. The discovery of placers in French Guiana dates from 1853.

In all the French colonies the gold that has been worked occurs chiefly, or exclusively, in the native state. An exception is found in a deposit in Annam, Indo-China. This deposit, the Bong-Miu, in crystalline schists is complex. Auriferous pyrite and galena predominate, the latter also carrying some silver, associated with which are blende, mispickel and chalcopyrite. The production of gold and silver from this mine in 1915 had a value of \$68,800.

Prof. Lacroix' paper contains interesting notes on the character of gold deposits in the several colonies

and gives a good summary of his views on the subject of laterization, of which he has made a special study.

W. G. M.

THE ENEMY MUST NOT BE ALLOWED TO KEEP FUEL AND IRON LANDS.

Mr. D. B. Dowling, President of the Canadian Mining Institute, at the recent meeting in Montreal, pointed out the importance of Germany's conquests of fuel and iron lands. He said, in part:

"Were peace declared without evacuation, the territories now held by Germany are such that France would lose an appreciable amount of coal and probably 85 per cent. of her iron ore. Her manufactures then would be confined to textiles and the non-metallies, and Germany would have the preponderance both in coal and iron over all Western Europe. Britain would have much less coal than Germany, and the demands for economy coincident with a realization of the possibility of its ultimate exhaustion would slow up manufacturing and naval activity in the former country and give Germany a commanding lead in the competition for world trade."

CANADA'S KHAKI COLLEGE.

The following notes are taken from the London "Graphic," March 16th, 1918.

"More than one Canadian soldier has told me, in answer to the usual question as to after the war plans, 'I think I shall go back to school.' At the Canadian Soldiers' College, Seaford, Sussex, such boys as these, and their older companions, whose ordinary schooling, but not their complete vocational training, was finished long ago, are going back to school, evening after evening, in their spare time of soldiering.

"The president of this wonderful college is the Dean of the Faculty of Applied Science in the University of British Columbia, Major R. W. Brock, M.A., F.G.S., M.I.M.M., F.R.S.C. He has a number of other degrees, mostly American, and he knows all about geology and metallurgy and mining, subjects of great importance in a country still rich in undeveloped resources.

"The department of engineering, with a McGill man, Major Davis, D.S.O., B.A., B.Sc., at its head, includes many subjects useful both in the army and out of it."

The Granby Consolidated Mining, Smelting & Power Co. has begun the construction of a coking and by-product plant at Anyox, B.C. The company has coal lands on Vancouver Island, which are now being developed to produce about 200 tons coal per day by the end of the year.

ONTARIO FLUORSPAR PRODUCTION INCREASING.

Fluorspar is in good demand in the United States and recent prices in New York quoted in New York are around \$35 per ton for prompt shipments, and \$28 per ton for 1918 contracts.

Fluorspar mining in Ontario has never been a big industry; but considerable shipments are being made from mines near Madoc. Shipments increased from 1,283 tons in 1916 to 4,213 tons in 1917. Production this year is expected to be much larger.

The Wellington and Munro property near Madoc was acquired in February by the Mining Corporation of Canada, which is now operating the property.

CARBOCOAL*

An elaborate series of experiments has been conducted during the past 3 years at Irvington, N.J., which has resulted in the perfection of a process for the manufacture of smokeless fuel from high-volatile coals, and for the recovery and refinement of the coal-tar products derived therefrom. These experiments have been financed by Messrs. Blair & Co., of New York, and were conducted under the direction of Charles H. Smith, the inventor of the process.

The low-temperature distillation of coal has interested investigators for many years. Sporadic attempts have been made to solve the mechanical problems, but until the Smith process was developed, they were not carried to conclusions of economic value. The present coal shortage and the increasing demand for smokeless fuels make this subject one of timely interest.

Mr. Smith's experiments have resulted in the production on a commercial scale of:

1. A fuel, called Carbocoal, which, for convenience in handling, is prepared in briquet form.
2. A yield of tar more than double that obtained in the ordinary by-product coking process.
3. Ammonium sulphate in excess of that normally recovered in the ordinary by-product coking process.
4. Gas, in amount approximately 9,000 cu. ft. per ton of coal carbonized, which is at present used in the process.

The essential features of the Smith process are the two distillations carried on at different temperatures, first of the raw coal and second of the raw briquets. The raw coal, after being crushed, is distilled at a relatively low temperature, 850° to 900° F., and the volatile contents are thereby reduced to the desired point. The result of this first distillation is a large yield of gas and tar, and a product rich in carbon, termed semi-carbocoal. The semi-carbocoal is next mixed with a certain proportion of pitch obtained from the tar produced in the process, and this mixture is briquetted. The briquets are then subjected to an additional distillation at a higher temperature, approximately 1800° F., resulting in the production of carbocoal, the recovery of additional tar and gas, and a substantial yield of ammonium sulphate.

Carbocoal is dense, dustless, clean, uniform in size and quality, and can be readily handled and transported long distances without disintegration. It is grayish black in color, slightly resembling coke, but its density more nearly approaches that of anthracite coal. It is manufactured in briquet form and can be made in any size, from 1½ oz. to 5 oz. The larger sizes are better suited to locomotive purposes, and the smaller sizes for domestic use.

Heretofore, devolatilized fuels, such as coke, have not attained the high rates of combustion desired for locomotive, marine and general steam purposes; and their greater displacement has operated against their general use where transportation cost of stowage space has been an important factor. Carbocoal overcomes these objections. It is actually a relatively soft but tough form of carbon, readily attacked by oxygen in combustion; and for this reason, requires much less draft than other high-carbon fuel.

Carbocoal has been tested by the Long Island Railroad; by the Pennsylvania Railroad at its testing plant at Altoona; by the Carolina, Clinchfield & Ohio Railroad; and by the United States Navy.

These tests have demonstrated that the fuel is smokeless; that it will evaporate from 8.5 lb. of water at a combustion rate of 100 lb. per square foot of grate surface per hour, to 12.8 lb. of water at a combustion rate of 27 lb. per square foot of grate surface per hour, from and at 212° F., per pound of fuel fired; and that it requires no greater draft than bituminous coal. A maximum combustion rate of 166 lb. per square foot of grate surface per hour has been reached for a short period.

Carbocoal has been found particularly suitable for the following purposes:

1. Marine and locomotive service, where limited grate area and restricted boiler capacity demand efficient fuel; where smoke is objectionable or dangerous, as in the case of ships in time of war.
2. Stationary boilers, where smoke pollution of the air is offensive and dangerous to health.
3. Domestic uses, including furnaces, stoves, ranges and open grates, where cleanliness is a desirable factor.
4. Kilns, drying and roasting ovens, and all purposes where an intense and uniform heat is desired.
5. In metallurgical furnaces, as a substitute for coke.
6. Gas producers.

TORONTO'S NEW ELECTRIC STEEL PLANT.

Since the beginning of 1917, there has been built in Toronto a steel plant that is entirely electrical in operation. Ten Heroult furnaces are used and power is obtained from Niagara Falls. The plant was built for British Forgings, Ltd., a company organized to carry out certain work for the Imperial Munitions Board. Several of the furnaces have been in operation for some months remelting scrap steel, which has naturally been produced in Canada in much larger amounts than usual during the war. Some interesting details of the construction of the plant are given in "Iron Age."

Work was begun on the Ashbridge's Bay site, recently reclaimed, in February, 1917. Steel was made in the first furnace on June 16, 1917, and the other furnaces were completed on the following dates: June 26, June 30, July 5, July 7, August 11 (three) and August 16 (two). The consulting engineers were Perin & Marshall, New York. General direction of the plans for the plant were in charge of Col. David Carnegie, of the Munitions Board.

The furnaces are of six-ton's capacity, erected with tilting mechanism on the casting floor level and the furnaces proper on a reinforced concrete charging floor, 12 feet above the casting floor. Electric power consists of three-phase, 25-cycle, 13,200-volt, alternating current, supplied by the Hydro-Electric Power Commission of Ontario. Transformers supply current to the furnaces at 100 volts. Three electrodes, each 17 inches in diameter, are used.

The plant has been making 12-in. ingots and 6-in. shells, all of which are being turned into munitions in Canada. The Hydro-Electric Power Commission had the contract for electrical work; the Toronto Harbor Commissioners for foundation work and the Hamilton Bridge Company for the structural steel.

BOUNTY FOR IRON IN BRITISH COLUMBIA.

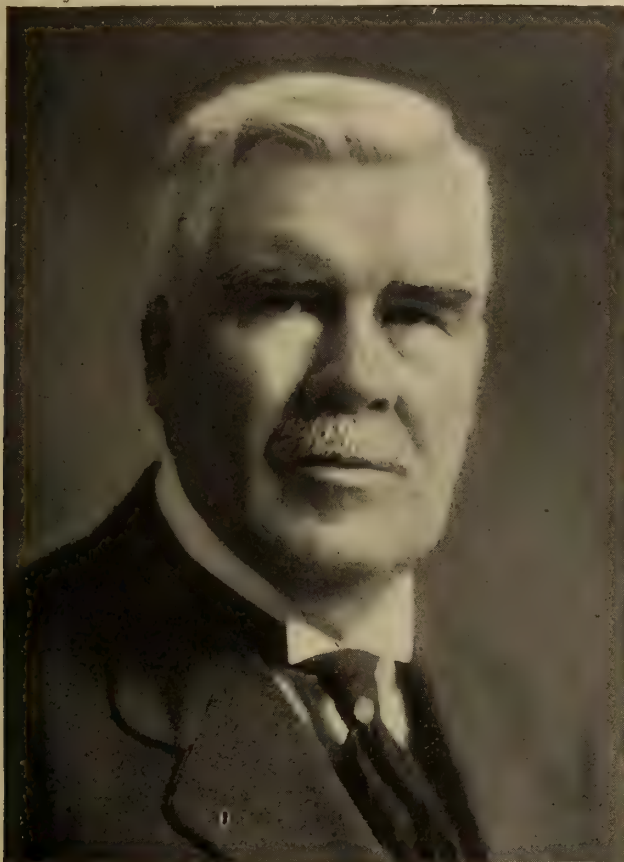
The Government of British Columbia proposes to aid the establishment of an iron and steel industry by offering a bonus of \$3 per ton of pig iron produced from ore mined in the province and \$1.50 per ton made from imported ores.

*Excerpts from a paper by Charles H. Smith, read at the Colorado meeting, American Institute of Mining Engineers.

OBITUARY.

John McMartin.

John McMartin, of Cornwall, Ont., member of the McMartin-Timmins-Dunlop syndicate of La Rose and Hollinger fame, has passed away. Mr. McMartin has been chosen to represent Glengarry in the Dominion Parliament and was in Ottawa for the recent opening of Parliament in spite of failing health. He had hoped to live to play a part in reconstruction after the war in the country in which he had done so much pioneer work.



—British & Colonial Press.

JOHN McMARTIN

In 1904, in association with his brother, the late Duncan McMartin, he became interested in the LaRose mine, and later in the Hollinger and other mining interests. He became the vice-president of the Hollinger Mines, vice-president and director of the Canadian Mining Finance Company, Ltd., president of the Princess Realty Company, president of the Labrador Pulp and Lumber Co., president of the Motherlode Sheep Creek Mining Co. of British Columbia, and was officially connected with many other notable Canadian corporations.

About a million and a half from Cobalt was John McMartin's reward. Railway contracting and participation in the Rossland movement had not enriched him. Cobalt, the fortuitous visit to Cornwall when his brother, Duncan McMartin, was endeavoring to procure capital for the LaRose discovery, made the McMartin-Timmins-Dunlop a millionaire quintette—but an unspoiled one. Consequently—and reciprocating the generosity—Noah A. Timmins and L. Henry Timmins included the Messrs. McMartin and Dunlop in their Porcupine gold mining ventures—first in importance of their kind on the North American Continent.

PERSONAL

Mr. W. J. Dick has resigned as mining engineer of the Commission of Conservation, and will be sales manager of Western Coal Mining Company.

Mr. H. Foster Bain has been appointed assistant director of the U.S. Bureau of Mines.

Mr. T. J. Brown, formerly general superintendent for the Nova Scotia Steel and Coal Co., has joined the staff of the Dominion Coal Co.

Samuel W. Cohen has resigned as general manager of the Crown Reserve Mining Company, Limited, and Porcupine-Crown Mines, Limited, which position he has held for ten years, to take up general consulting mining engineering practice with headquarters at Montreal. He remains with both of the above companies as consulting engineer.

Dr. J. M. Bell was in the Cobalt district recently and visited the Keeley mine.

Mr. A. R. Whitman was in Toronto last week, and is now in New York, where he is opening an office at 43 Exchange Place.

Mr. Alex. Sharp has been appointed general manager of the P. Burns Co., Ltd., Coal Mines, Sheep Creek, Alberta.

Mr. S. S. Fowler, general manager for the New Canadian Metal Co., operating the Bluebell mine at Riondel, Kootenay lake, B.C., has been receiving treatment by a specialist in ear troubles in a hospital in San Francisco, California.

Mr. Henry Maluin, head of a French syndicate that for some years has been operating a hydraulic placer-gold property each gravel-washing season, has returned to Atlin district of British Columbia for the current season's work. He spent last winter in the United States, instead of in France as in other winters. His company's gold leases are on Otter Creek, Atlin.

Mr. M. E. Purcell, of the Consolidated Mining and Smelting Co.'s mining staff, is back at Rossland, B.C., from a trip to San Francisco, California, and Portland, Oregon.

Mr. T. M. Daulton, manager of the Placer Mines Co., after spending the winter in Seattle, Washington, is again hydraulicking on Otter Creek, in Atlin camp, British Columbia, having returned north in April.

Mr. M. S. Davys, for many years engaged in mining in West Kootenay district of British Columbia, first in Nelson mining division, and in later years in the Slocan, has been at Berkeley, near San Francisco, California, for the winter. His latest enterprise was that of equipping the Kaslo concentrator with improved machinery and plant and operating it in treating zinc-lead ore from the Lucky Jim mine, Slocan.

Mr. Melbourne Bailey, manager of the several hydraulic placer-gold properties situated in Cariboo district of British Columbia and known as the John Hopp placer-gold mines, is again at Barkerville, Cariboo, after having been at his home in Tacoma, Washington, for the winter. Supplies for the season have been shipped for Barkerville, and preparations for resuming hydraulicking were well advanced last month. Mr. Hopp will also be at Barkerville shortly.

The assay office of the Rosebery-Surprise Mining Company at the company's concentrator near Rosebery, Slocan Lake, B.C., has been destroyed by fire.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Announcement has been made that the restriction as to quantity of lead ore that will be received at the Consolidated Mining and Smelting Co.'s smelting works at Trail, West Kootenay, has been removed, and that now all lead ore offering will be accepted. It is stated, though, that the lead recovered will still have to be pooled, as was agreed between the company and Kootenay mine-owners some time ago, under which arrangement only twenty-five per cent. of the value is payable to shippers shortly after receipt of the ore, payment for the remainder being deferred until after the lead shall have been sold by the smelting company.

Little, if any, progress has yet been made in the direction of investigating matters in connection with the alleged unfair treatment of independent mine-owners who have been shipping, or who claim to have been prevented by restrictions imposed by the smelting company from shipping lead-bearing ores to the Consolidated Co.'s works at Trail. It is reported that there has been some delay in providing the requisite financial assistance, and that consequently members of the committee chosen for the work have not been disposed to undertake it until after the indispensable money provision shall have been made. The suggestion has been made that a Royal Commission be appointed instead of the committee of district mining men chosen at a meeting held earlier in the current year at Nelson, B.C., but it is thought that the complaining mine-owners would have little chance of a result in their favor should such a commission carry out the requested investigation, the opinion being that some of the allegations against the smelting company would be found to be not sustained. Meanwhile time is passing and it may be that conditions will adjust themselves to such an extent that the demand for an investigation will not be pressed. Those who are most unfavorably affected by the change in smelting rates and other charges of the last year are the smaller shippers, who have found that under the altered conditions it has not been practicable to continue operating, not at any rate where proceeds of ore mined were required to finance operations.

EAST KOOTENAY.

Metalliferous mining has shown little change in recent weeks in the several mining divisions of East Kootenay. Against an output from the Sullivan mine in March of 10,101 tons, chiefly of zinc ore, giving an average of 326 tons a day, there was a total of 4,430 tons, or about 316 tons a day, for the first fourteen days of April. Other shippers during the whole of those periods were the Paradise, 525 tons; St. Eugene, 119 tons, and Isaac, 28 tons.

Coal mining in Southeastern Kootenay continues active, with production less than it would be were more miners obtainable. The Crow's Nest Pass Coal Co. is operating mines at both its Coal Creek and Michel collieries, and is making coke at both Fernie and Michel. With smelting works in both West Kootenay and Boundary districts, and at Northport, in the State of Washington, requiring coke, the demand is well maintained, so that a ready market is available for the output of the Crow's Nest Pass Coal Co.'s ovens.

WEST KOOTENAY.

Ainsworth.—Much of the ore that has been shipped from the Bluebell mine at Riondel, across Kootenay lake from the town of Ainsworth has been oxidized lead ore. Last year about 1,000 tons of ore of similar char-

acter was shipped, also to Trail, from this mine.

The Florence Silver Mining Co. is operating its concentrating plant again, not on full time though, but running only one shift daily. The chief producing mine in Ainsworth camp is now the No. 1, owned by the Consolidated Mining and Smelting Co.

Slocan.—Not much ore from Slocan mines went to Trail during the first half of April, the only mine appearing on the list having been the Standard with a total of 206 tons. No ore was received from the Lucky Jim zinc mine, which during March shipped 289 tons out of a total from Slocan of 575 tons, which, however, does not represent the total production for that month, ore having also been shipped to smelting works in the United States.

Nelson.—Shipment of ore from the Yankee Girl mine has been resumed. This property is situated near Ymir, in the central part of Nelson mining division. Some years ago a comparatively large quantity of ore, containing gold and silver was shipped to Trail and other smelting works, but in more recent years production had been suspended and the development of the mine at a lower level carried out on a scale that resulted in opening much ore. In addition to doing development work, the operators of the mine constructed an aerial tramway from the portal of the lower adit-level to the railway at Ymir, a distance of approximately one mile, thus affording transportation facilities not previously available. The cost of the development of the mine has been provided by the Buchanan syndicate of Fort Worth Texas, which, after the old Yankee Girl company went into liquidation, acquired the property under option of purchase and has since expended much money in developing and equipping it for ore production.

Ore receipts at the Consolidated Co.'s smelting works at Trail from mines in Nelson division, have been small during the current year, the total to April 14 having been less than 1,000 tons. The Consolidated Co.'s Molly Gibson mine, situated in the northeastern part of the division, north of the West Arm of Kootenay Lake, shipped 597 tons of silver-lead ore. This mine is near the head of Kokanee creek, which flows into the West Arm a few miles below Balfour. There is a concentrating plant at the mine. Transportation is by aerial tramway for the greater part of the twelve-mile distance between the mine and the landing on the lake. Another shipper is the Emerald, near Salmo, in the southern part of the division; its product is a lead ore, of which 242 tons had been received at Trail up to the end of the week closed on April 14. The Monarch-Beasley, near the Kootenay river, about nine miles west of Nelson, has this year shipped 84 tons of copper ore. Small shipments from the Salmo region comprise 23 tons of gold ore from the Ore Hill, above Sheep Creek, and 7 tons from the Aspen.

Trail.—Ore receipts at the Consolidated Mining and Smelting Co.'s smelting works here totalled 19,604 tons for the first two weeks of April; the proportion from mines operated by the company was 17,459 tons, while the remaining 2,145 tons was of custom ore. More than one-half of this ore was from the company mines in Rossland camp, which shipped 10,066 tons of gold-copper ore. The proportions from other of the company's mines were as follows: Sullivan, in East Kootenay, 4,430 tons of zinc ore; Emma, in Boundary district, 1,621 tons of copper-gold ore; No. 1, in Ainsworth camp, 1,003 tons of silver ore; Molly Gibson, in Nelson mining division, 203 tons of silver-lead ore, and High-

land, in Ainsworth camp, 84 tons of silver-lead ore. Among the custom ore shippers were the Le Roi No. 2 Co.'s Josie mine, in Rossland camp, 959 tons of gold-copper ore; the Bluebell, on the eastern shore of Kootenay lake, 389 tons of lead ore; the Standard, near Slo-can lake, 206 tons of silver-lead ore, and the United, in the State of Washington, 334 tons of copper ore. The total of receipts at Trail in 1918, to April 14, inclusive, was 122,722 tons, of which 107,944 tons was ore from mines operated by the company and 14,778 tons was of custom ore.

NORTHERN ONTARIO.

Keeley Silver Mine May Be Re-opened.

The re-opening of the Keeley mine in South Lorrain is under consideration. The property was under option to English interests at the time the war broke out, and at that time, owing to the fact that it was expected the war would be of short duration, an extension of time on the option was asked for and granted, giving the holders of the option until one year after the close of the war to complete the terms of their contract. The result has been that the mine has remained in idleness ever since. The Keeley mine was equipped with a powerful mining plant during the years 1908-09, and at one time figured prominently in the affairs of the now defunct Farmers' Bank. A car-load of extremely high-grade ore was shipped, but the values did not prove consistent. A number of large veins carrying smaltite and low silver values are in evidence on the surface and the possibility of the property being operated with success appears to be good. The Keeley adjoins the Wettlaufer, which, along with the Currie property, is being operated by the Pittsburg-Lorrain Syndicate, producing very substantial quantities of silver. In the neighborhood of two million ounces of silver has been produced at the Wettlaufer since the development of the property was first started.

Adanac Development Work.

The development work under way at the Adanac Mine, Cobalt, is causing more than ordinary interest, owing to the fact that the drift at the 310-ft. level is nearing the point where the 30-in. vein in evidence on the surface of the property should soon be cut. This calcite vein carries considerable quantities of cobalt. A study has been made of the geological structure of the property by one of the leading geologists of the country and his report is favorable. The drift is in the Keewatin formation. The Keewatin lies like a blanket over the underlying diabase. The shearing already encountered in the drift is approaching the southward slope of the diabase and is very pronounced. Approximately one hundred feet of drifting was done during the month of April, and if the same rate of progress is maintained for the present month, the large vein on the surface should be cut about the last week in May. The work of drifting is costing in the neighborhood of \$18 per foot, which compares well with the best records established in the camp. The company have upwards of 280,000 shares of stock in the treasury, and are financed for the carrying on of operations for the balance of the present year, before which it is anticipated results at the property will place it on a self-sustaining basis.

Will Re grind Sands and Cyanide the Slimes.

The Mining Corporation of Canada is making preparations for the treatment of half a million tons of tailings deposited in the bed of Cobalt Lake from the Cobalt Reduction mill. The mill is being altered to permit of the treatment of 300 tons per day

at once and the capacity will eventually be brought up to about 700 tons per day. A pump, with a capacity of about 1,000 tons per day, is being installed to feed the mill and at the same time place a large amount of the tailings close to the mill to permit of operating during the winter months when the lake is frozen. The method of treatment of these old tailings will be that the sand will be pumped to the classifier, the slimes will be treated in the cyanide section of the mill, and the sands after regrinding in the tube mills will be run over the concentrating tables and treated by oil flotation. The work of altering the mill is now under way.

Exploring the Waldman Property.

Exploration of the Waldman property of the Mining Corporation of Canada is being aggressively prosecuted. A number of narrow calcite veins have been found, in the conglomerate, but so far these have not been found to carry commercial silver values. Two machines have been employed exploring the conglomerate until the past week, when a third machine was added to expedite the work.

Mr. S. Renaud has optioned the McGregor group of claims in Gillies Limit, a few miles south of Cobalt.

Ophir Development Work.

The drift at the 410-ft. level of the Ophir Cobalt property has entered most promising ground, and now the management is sinking a winze from the 410-ft. level to the contact, between the diabase and Keewatin. Another drift running diagonal to the main development drift at the 410-ft. is being run for the purpose of tapping nine veins previously located on the 300-ft. level, some of which are of a very promising character. The management look forward to important results from this development. A comprehensive development programme has been financed at a favorable price.

Good Ore Found on Green-Meehan.

Working at a depth of 245 ft. from a winze at the old Green-Meehan property, a wide vein carrying considerable silver, cobalt and nicolite has been encountered. The high-grade streak carries values of upwards of two thousand ounces to the ton, over a width of three inches, while considerable good grade mill rock is in evidence on either side of the vein. In the earlier working of the mine a crosscut had been driven to a point on an upper level where the vein should have been encountered. The present management is understood to have removed a considerable amount of waste rock and debris from this working, with the result that the vein was revealed at precisely the point where it should occur. Here also the values in the vein are said to be of a fairly high grade. The new vein encountered at the 245-ft. depth occurs in a diabase dike close to, and running parallel to, a diabase Keewatin contact. Drifting is proceeding on the new vein.

Hopeful for Temiskaming.

The exploration of the Temiskaming Mine is being actively conducted at and above the 500-ft. level as well as at the 1,600-ft. level. On the 300-ft. level, two veins are being followed which are yielding fair returns, and the management is highly optimistic as to the future of the company. Recently, After R. Whitman made an exhaustive study of the property, and while his report has not been made public as yet, his remarks relative to the future outlook for the mine are understood to have been optimistic and present operations are being conducted along the lines of his suggestions.

Will Develop Molybdenite Property.

A new company is being organized to be known as the Indian Peninsula Mining Company to take over molybdenum ores along the Hurricanaw River, near Amos, Que., on the National Transcontinental Railway. Results already obtained from development work done is spoken of by local engineers in the highest terms, considerable ore bodies being now exposed. A 100-ton mill is to be erected as soon as possible and the treatment of ore commenced. Mr. H. G. Mathewson, banker, Cobalt; Mr. Balmer Neilly, of the Penn-Canadian Mines, and Mr. Frank Groch, of the Groch Centrifugal Flotation, Limited, are interested in the enterprise. Mr. Groch has contracted for the building of the mill.

Another Good Year for Nipissing.

According to the annual report of the Nipissing Mining Company, 4,212,000 ounces of silver was produced at a cost of 25.117 cents per ounce, and the total receipts were approximately \$3,700,000. The yearly average price at which silver was sold was 83.19 cents per ounce at Cobalt, which was nearly two cents higher than the average New York price for the metal during the year. The known ore reserves show a silver content of about 8,100,000 ounces, or approximately 1,000,000 ounces less than the reserves of December 31st, 1916. However, by reason of the advance in the price of silver, the reserves are estimated at something like \$700,000 more than as of December 31st, 1916. The surplus as of December 31st was \$2,731,000. This is an increase over the previous year of about \$750,000. The stockholders received during the year \$1,800,000, and there has been paid to shareholders since July, 1906, to January, 1918, approximately \$16,750,000. As no large veins were discovered during the past year, the production of nearly 4,000,000 ounces of silver naturally resulted in some decrease in the ore reserves. The underground reserves were decreased about 60,000 ounces; the surface dumps tonnage making up the difference of about a million ounces between the two years. The ore reserves at the present time are estimated to contain 8,076,540 ounces of silver.

Discovery at Three Star Mine.

An important discovery was recently made at the property of the Three Star Mining Company, Cobalt, formerly the Calumet and Montana Mining Company. The vein is said to be from three to five inches in width and in places to carry high silver values. A crew of over twenty men and three machines are employed in operating the Three Star property.

Mr. Whitman Goes to New York.

Mr. Alfred R. Whitman has removed his offices from Cobalt to New York. Mr. Whitman has been instrumental in solving many of the geological problems met with in the mining camps of Northern Ontario. With offices in New York, he will not only continue his connections in the north country, but will also extend the scope of his work to other fields. As a geologist, Mr. Whitman has gained for himself an enviable reputation throughout the north country.

More High-grade Ore at Chambers-Ferland.

The vein recently located at the Chambers-Ferland property of the Aladdin-Cobalt Mining Company continues to yield high grade. At one time, the vein was found to have faulted, but it has since been relocated, and at present continues strong.

Will Re-open Savage Mine.

The McKinley-Darragh Mining Company has de-

cided to re-open the Savage section of their property and an aggressive plan of operation will be carried out. It is estimated that there are from eight to ten acres of conglomerate formation on the property which as yet has been unexplored and which is now considered to have good possibilities of being productive. In addition to this new prospective area, a considerable amount of low-grade ore is now in sight. With the increase in the price of silver, it is possible to mine ore of a lower grade profitably now, that three years ago did not pay for the handling.

250 Claims Staked in Doherty District.

Already some 250 mining claims have been staked in the Doherty district, about twelve miles south of Temagami. This number of claims comprise about 10,000 acres. Among those interested in the district are a number of Cobalt mining companies, and it is quite evident a large amount of work will be done during the next few months. The geology in the vicinity of Doherty resembles to some extent that of the Cobalt district. Although as yet insufficient work has been done in the district to give any definite opinion as to its future possibilities, the outlook is at least promising.

Development Work at Genesee Mine.

Development work at the lower workings of the Genesee is being attended with encouraging results. Recently a fault was encountered at the 500-ft. level, in which ruby silver occurred deposited in a fracture along the fault. It would appear that a silver vein is in close proximity to the present point of operations. Further work will be carried on along the fault. Drifting is also proceeding on a promising vein at the 500-ft. level and has been carried for about 36 ft., at which point a stope has been started. The vein in the first round of shots in the stope widened out from about half an inch to one and a half inches in width. The Genesee lies adjacent to the Chambers-Ferland.

Patricia Mill Should be Ready Soon.

It is expected that the new mill at the Patricia Syndicate property at Boston Creek will be in operation by the end of the present month. The machinery is on the ground and the work of installation is proceeding rapidly. The equipment consists of a Blake crusher, Allis-Chalmers ball mill, a classifier, amalgamating plates and Wilfley tables. The capacity of the mill will be between 50 and 60 tons per day.

Underground developments continue highly satisfactory and the management anticipates no difficulty in keeping the mill up to capacity. With less than seven months between the date of breaking of the first ground and the commencement of production, a new record for mining operations will be established in this country. Mr. Charles O'Connell, formerly manager of the Tough-Oakes is manager and part owner of the Patricia. The property was formerly known as the Boston Hollinger. Development work here is rapidly proving the merits of the Boston Creek camp.

Will Develop Ontario-Kirkland Property.

Arrangements are being made for the commencement of operations on the property of the Ontario-Kirkland Mining Company, which lies a short distance south from the Wright Hargreaves and with the Hunton and Canadian Kirkland comprise the south auriferous zone of the Kirkland Lake camp. This zone appears to parallel the north of main zone along which are situated the present big producers of the camp. The recent favorable developments on the Canadian Kirkland are attracting interest in that direction and a further big

expansion may be expected. It is reported that the company have made arrangements for the expenditure of \$50,000 in development and the work will begin shortly.

Machinery on Way to Otisse Property.

The machinery for the development of the Otisse property at Fort Matachewan is well on its way to the property. The diamond drilling equipment is already on the ground and will be in operation in the course of a few days. Most of the heavy machinery for the mining plant has been transported as far as the east branch of the Montreal river from which point it is proposed to move it over the river on floats or barges, after which but a short haul remains to the property. Navigation on the river and lake is now open.

May Re-open Tommy Burns Property.

It is rumored that Mr. Clarence R. Pope is making arrangements for the re-opening of the Tommy Burns property in Shaw Township, near Porcupine, which has been idle for several months.

Barite Mill at Premier Langmuir.

It is expected that the mill at the Premier Langmuir Barite property will be in operation early in June. The property is situated in Langmuir township, a few miles south-east from Porcupine. Delay in the delivery of certain parts of the equipment is holding up the commencement of milling operations.

Davidson Mill in Operation.

A \$9,000 gold bar has been shipped from the Davidson property in the Porcupine camp as the result of the initial run of the new mill, and was the result of the treatment of relatively low grade ore. The mill is steadily increasing its output and the grade of ore now being put through is high. The mill has been so constructed as to permit of increasing the capacity to 100 tons per day with very little difficulty and additional cost. It is expected the management will pursue this course in the near future. The ore body recently developed at the mine has a decided pitch to the south and appears to be an entirely new body, quite independent of the original body that showed on the surface. At least this is the opinion of two mining engineers who have recently examined the property. Should future developments establish this as fact, it will give to the property much greater possibilities.

Elliott Kirkland.

The shaft at the Elliott Kirkland property has reached a depth of about 480 ft. When the 520-foot is reached a station will be cut and the vein crosscut for at this depth. Owing to results encountered on the Kirkland Lake Gold, which adjoins the Elliott Kirkland, it is anticipated that the vein will show considerable enrichment and further widening out at this point. More than ordinary interest attaches to the development of Elliott Kirkland during the next few months as it will prove the consistence or otherwise of their promising orebody which has been located at the 300-ft. level, and have a definite future bearing on the development of the property.

Schumacher.

Labor conditions in the Porcupine camp together with the increased cost of supplies has resulted in the curtailing of milling operations at the Schumacher. However, with a return to more normal conditions in either the supply of labor or the cost of materials this company would be in a position to immediately take advantage of this change and their shareholders will eventually reap the rewards of their conservative policy for the development of their properties.

First Clean-up at Lake Shore Plant.

The results of the first clean-up at the Lake Shore mill at Kirkland Lake has exceeded the most sanguine expectations of the management. Approximately \$40,000 was the result of a twenty-three days' run. The mill is designed for the treatment of 60 tons of ore per day, thus the grade of ore must have averaged approximately \$28 per ton. Costs are being held down to about \$8 per ton of ore treated, and with the grade of ore being treated the profits run in the neighborhood of \$20 per ton or at the rate of \$1,200 per day. This is at the rate of about \$52,170 per month, or an annual output of \$626,240. The estimated net profits on production are equal to \$432,000 annually, which is equivalent to twenty-one per cent. on the par value of the 2,000,000 shares issued capital of the company. The mine is not encumbered with any indebtedness, the sale of treasury stock being sufficient to place the property in its present paying position.

Mining Corporation Makes Second Payment on Rickard Township Claims.

The Mining Corporation of Canada has made a second payment on the group of claims taken under option last summer in the township of Rickard. Considerable surface and underground work has been done on the property. The main shaft has reached a depth of one hundred feet and lateral work has been under way at this point for some time. A fairly extensive mining plant has been taken in and diamond drilling is under way. A force of about fifty men are engaged and the development of the property is being conducted in an aggressive manner. Success on this property would no doubt be followed by a good deal of exploratory work in the district wherein the rock formations are concealed by a heavy overburden of clay.

Lightning River Claims Will Be Developed.

Claim owners in the Lightning River district are being given permission to proceed with their development work and a large number are leaving for the district from day to day. The new road has been completed to within a few miles of the discovery group of claims and a small grant of money has been provided by the government to those interested in the district to help complete the work. It is expected that if the district proved up to expectations, further grants of money will be forthcoming for the improvement of the road.

MOLYBDENITE DEPOSITS OF ONTARIO.

In the recently published 26th annual report of the Ontario Bureau of Mines, Dr. A. L. Parsons describes molybdenite deposits of the province which he visited in May, June and September, 1916. According to Dr. Parsons nearly every molybdenite deposit of commercial importance in eastern Ontario is near the contact of granitic rock and crystalline limestone.

EUXENITE IN ONTARIO.

A radio-active mineral, euxenite, was discovered in 1915 in a feldspar quarry near Maberly, Lanark Co., Ontario, by J. A. Morrow. Specimens forwarded by Mr. T. W. Gibson, Deputy Minister of Mines, to England, were analyzed by the Imperial Institute. Dr. W. G. Miller and C. W. Knight visited the quarry in June, 1917, and some account of the deposit is given in the recently issued 26th Report of the Bureau of Mines.

CARELESS CAGER CAUSES HOISTING ACCIDENT AT MOND NICKEL MINE.

While hoisting a cage containing ten men from the twelfth level, 2,600 ft., of the Mond No. 1 mine at 3 a.m., April 27th, the cable broke at a point about 40 ft. above the cage, when the cage was about 400 ft. above the twelfth level.

The men had all been hoisted from the eleventh level 2,300 ft., and the cager on that level had come to the surface and reported that he had pulled the chairs on that level. The cage in the west compartment was at the twelfth level and the cage in the east compartment, which had just come from the eleventh level, was sent to the twelfth level. The cager had left the chairs in at the eleventh level in the east compartment and the cage stopped at that level, the 300 ft. of cable looping over and dropping down the west compartment. The cage in the west compartment with ten men on was rung up and was hoisted through the coils of cable hanging in this compartment. The cable coiled around the cage and around the dogs until at a point about 100 ft. above the eleventh level the coiled cable became taut and the hoisting cable in the west compartment broke at a point about 40 feet above the cage. The cable coiled around the dogs prevented the safety catches from working, but at the same time acted as a brake between the dogs and the guides, so that the cage did not fall, but slid back slowly to a point about 100 ft. above the eleventh level the coiled cable became taut and held the cage. None of the men in the cage received serious injuries.

The cables were 3,800 ft. long when new, were 1½-inch (8 x 19) plough steel, and had a breaking strain of 67 tons. The hoist is a 400-h.p. electrically driven one. The circuit breaker acted at the same time as the cable broke.

B. Lonyez, the cager, was brought before Magistrate Stoddart at Sudbury on May 6th and sentenced to three months in gaol and a fine of \$50, or an additional one month.

HAMILTON COMPANY SECURES IRON ORE PROPERTIES IN MICHIGAN AND MINNESOTA.

The Steel Company of Canada has, in conjunction with other steel companies, secured two iron ore properties, one on the Gogebic and one on the Mesabi range. The ore will be paid for on a royalty basis. Shipments from the Gogebic range mine will be available this year and from the Mesabi late in 1919.

WILL PRODUCE COKE AT HAMILTON.

President Robert Hobson, of the Steel Company of Canada, reports that all the contracts for the by-product coke oven plant, to be installed at Hamilton, have been let. It is hoped that production of coke will begin in November. The company's blast furnaces at Hamilton will be supplied.

INDIAN PENINSULA MINING CO.

The Indian Peninsula Mining Co. has been formed to operate the molybdenite properties of St. Maurice Mines, Ltd., near Amos, Quebec. Frank Groch and W. E. Simpson of Cobalt are interested in the enterprise.

HOWE SOUND PAYS DIVIDEND.

The Howe Sound Co. has announced a dividend of \$99,205. This company is a holding company, controlling the Britannia Mining & Smelting Co., of Howe Sound, B.C.

GOOD ORE DEVELOPED IN COAST COPPER MINE.

Encouraging progress is reported to have been made by the Coast Copper Company in connection with the development of its property in Quatsino mining division of Vancouver Island, B.C. Control of the company is held by the Consolidated Mining and Smelting Company. The property consists of a large group of mineral claims, situated between Hardy Bay on the east and Quatsino Sound on the west side of Vancouver Island. Development includes five adits and a shaft, 700 ft. depth having been reached by this work. On both the 500 and the 700 ft. levels about 600 ft. of drifting has been done. Much chalcopryrite ore of good grade has been opened, beside which there is a large body of magnetite in which copper, gold and silver occur.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.25 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 17 cents per lb.

May 9, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10 cents per lb.

Lead, 9 cents per lb.

Antimony, 16 cents per lb.

Copper, casting, 28 cents per lb.

Electrolytic, 28½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

May 9, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York	London
	cents.	pence.
April—		
22	99¾	49
34	99¾	49¼
25	99¾	49¼
26	99⅝	49¼
29	99⅝	49¼
30	99⅝	49¼
May—		
1	99⅝	49¼
2	99½	49¾
3	99½	49¾

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange at the close of business May 9, 1918:

Gold.

	Bid	Ask
Apex .....	.04¾	.05
Dome Extension .....	.10¼	.10½
Dome Lake .....	.19	.20
Dome Mines	7.00	7.35
Hollinger	4.85	4.93
Imperial .....	..	.01¼
McIntyre	1.33	1.34
New Ray .....	.18½	.19
Porcupine Crown .....	.12	.14
Vipond .....	.13	.16
Preston East Dome .....	.02¾	.03

Teck-Hughes .....	..	.48½
West Dome .....	.11¾	.12½
Silver.		
	Bid	Ask
Adanac .....	.10½	.11
Bailey .....	.03½	.04
Buffalo .....	..	1.00
Beaver .....	.26	.27½
Chambers Ferland .....	.11½	.12
Coniagas	2.90	..
Crown Reserve .....	.11	.19
Gifford .....	.02	.02½
Great Northern .....	.03	.03½
Hargraves .....	.06¾	.07½
Hudson Bay .....	..	35.00
Kerr Lake .....	..	6.00
Larose .....	.42	.45
McKinley .....	.39	.39¾
Nipissing	8.70	9.00
Peterson Lake .....	.09¾	.10
Right of Way .....	.03¾	..
Seneca Superior .....	.01¼	..
Silver Leaf .....	.01¼	..
Temiskaming .....	.29¼	.29½
Wettlaufer .....	.04	.06½
Mining Corporation	3.72	..
Provincial .....	.51	.53

NEW YORK MARKETS.

May 3, 1918.

Connellsville Coke—

Furnace, *6.00.

Foundry, *7.00.

Crushed, over 1-inch:

Beehive, *7.30.

*Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, 23.50.

Electrolytic, 23.50.

Casting, 23.50.

Lead, Trust price, 7.00.

Lead, outside, nominal, 7.00 to 7.12½.

Spelter, prompt western shipment, 6.95 to 7.00.

Antimony—

Chinese and Japanese, nominal, 13.00.

Aluminum—Government price, carload lots, f.o.b. plant:

98-99% Virgin, 32.10.

98-99% remelt, 32.10.

No. 12 Aluminum Co., 32.30.

No. 12 remelt, 32.30.

Sheet 18 ga. and heavier base, 40.20.

Powdered aluminum, 65.00 to 70.00.

Metallic Magnesium—99% plus \$2.00 to 2.50.

Nickel—Shot and ingot, 40.00.

Electrolytic, 45.00.

Cadmium, nominal, \$1.45—1.50.

Palladium, \$115.00.

Quicksilver, nominal, \$120.00—125.00.

Platinum (pure), \$105.00.

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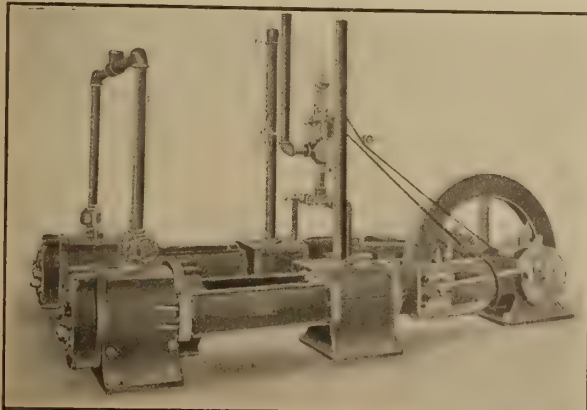
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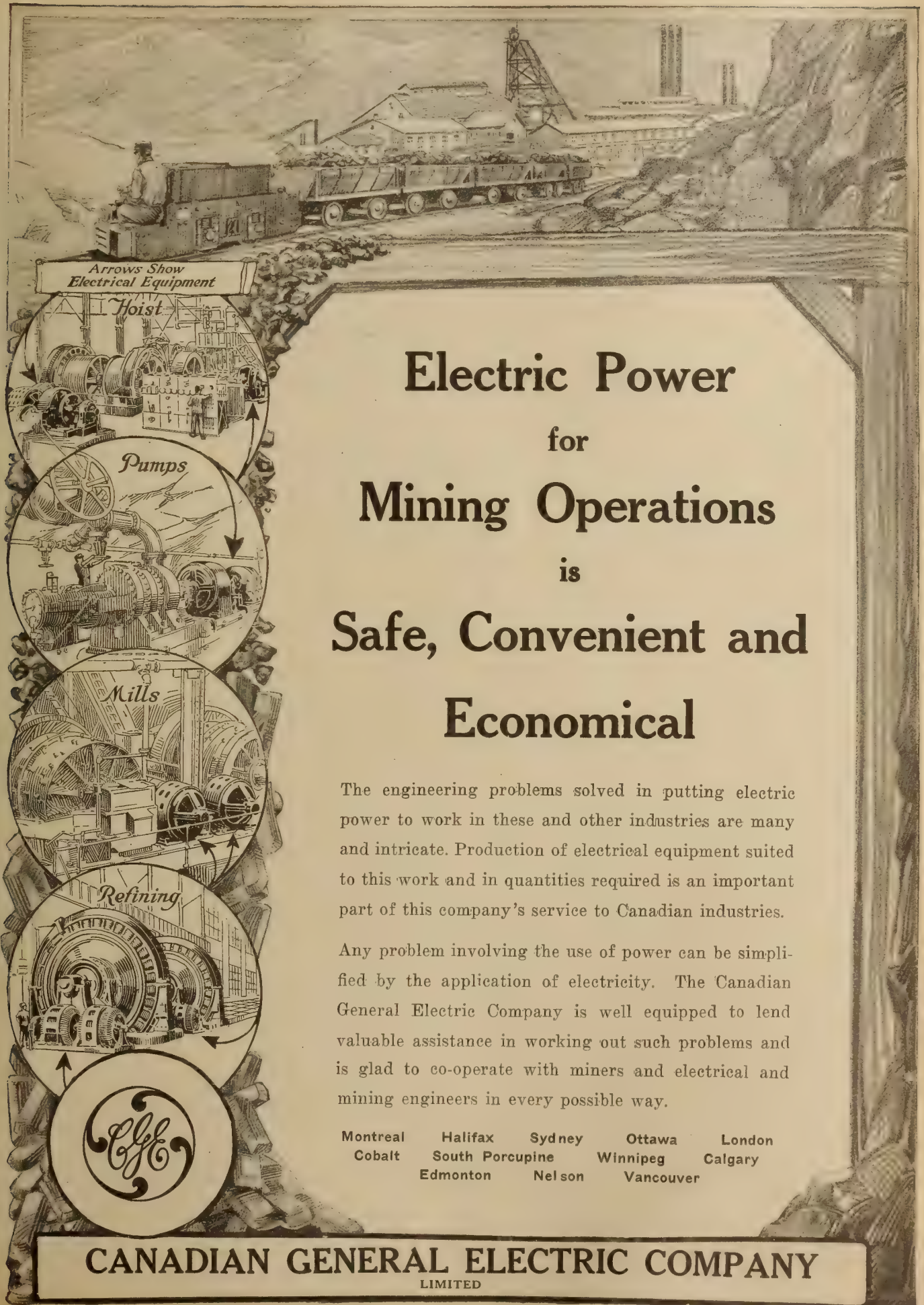
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- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
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- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
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- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
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To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by an agitation greater than, and different from that which had been resorted to before,*" resulting in a froth concentrate of economical value," and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

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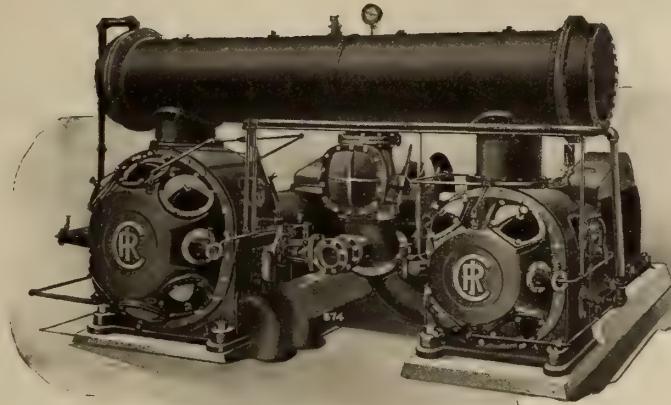
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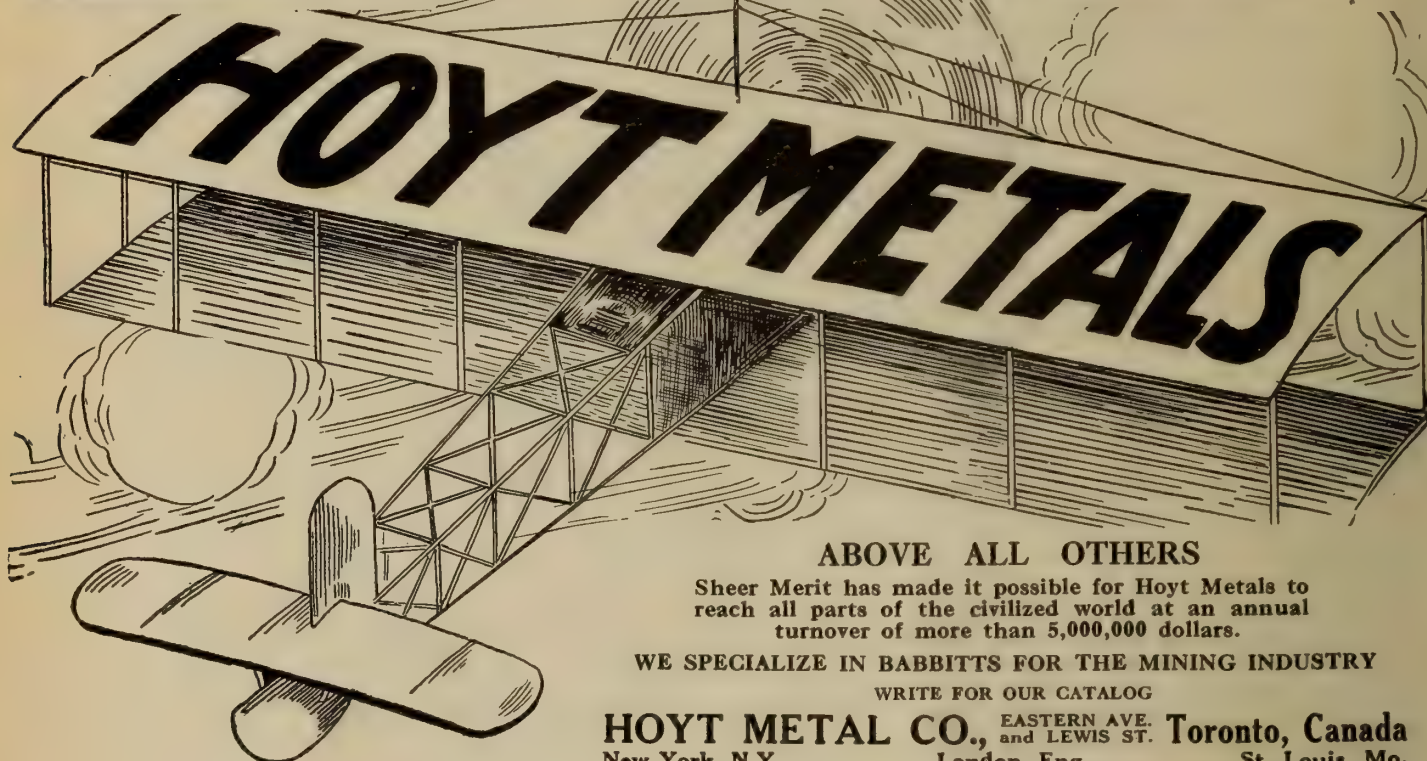
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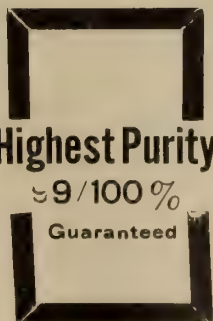
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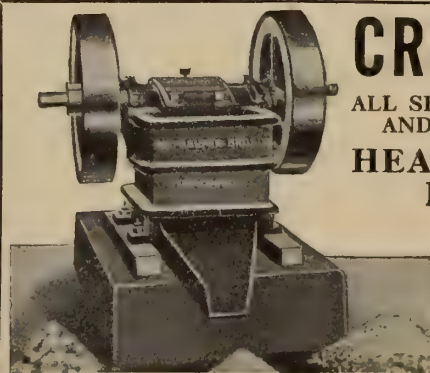
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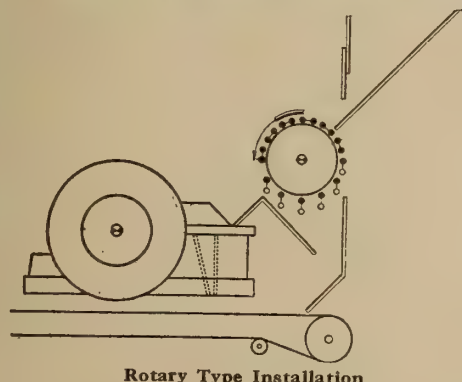
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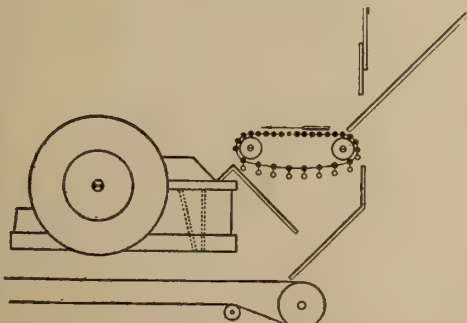
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The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

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Department of Colonization, Mines and Fisheries

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all Infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

All applications should be made direct to

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

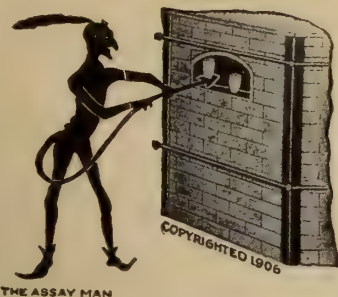
The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with mining Reports and Maps, may be obtained gratis by addressing

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VICTORIA, British Columbia

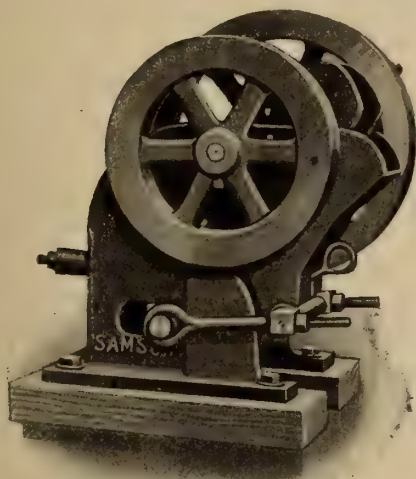


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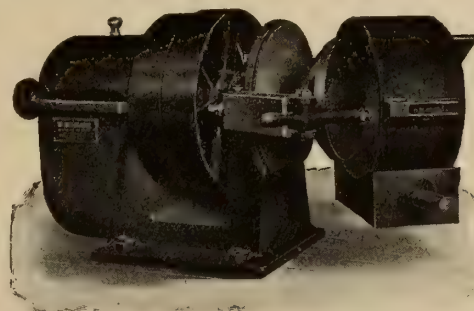
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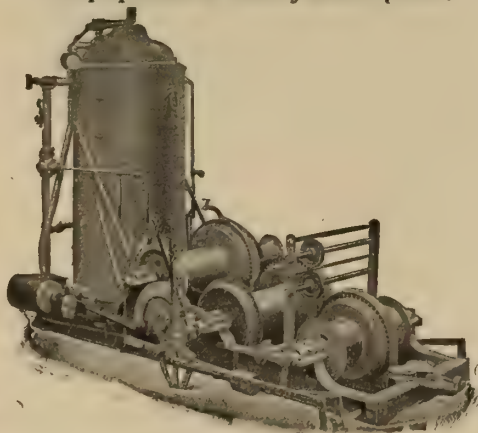
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, June 1st, 1918.

No. 11

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

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MINES PUBLISHING CO., LIMITED

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SUBSCRIPTIONS.

Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Single copies of current issue, 15 cents. Single copies of other than current issue, 25 cents.

The Mines Publishing Co. aims to serve the mining industry of Canada by publication of reliable news and technical articles. This company publishes the Canadian Mining Journal twice a month and the Canadian Mining Manual once a year.

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The Canadian Mining Journal covers the Canadian mining field. Ask for advertising rates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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As Mr. Lindsey pointed out at the annual meeting of the Canadian Mining Institute, the fuel problem of the Canadian West is largely one of transportation. In this the West is not peculiar, for shortage of locomotives and cars is obviously one of the chief causes for fuel shortage in Central Canada and the United States. Unfortunately the shortage of cars in the West and the high freight rates on coal coming east are not due to temporary causes.

The Granby Company evidently intends to make itself as independent as possible of others so far as fuel is concerned. By opening a coal mine on Vancouver Island and installing a by-product coke oven plant at Anyox, the company has taken steps which should insure a satisfactory fuel supply.

REPORT OF MUNITION RESOURCES COMMISSION

The Munition Resources Commission, appointed by Order-in-Council in November, 1915, "for the purpose of instituting an enquiry respecting the supply and sufficiency of raw materials in Canada required for the production of munitions of war, and the best means of conserving the same," has issued its first report.

One of the matters taken up by the Commission was that of assisting Canadian firms to obtain supplies of tool steel from the United Kingdom. It was arranged that all orders for such steel for munition work should be subject to certification by the Commission. Later the Commission was called upon to certify to the requirements of other Canadian users. This procedure was followed for a year; but in Feb., 1917, the Department of Trade and Commerce was asked by the Imperial Government to act as a local Priority Authority for Canada and the Commission's certification was no longer required.

Acting on the advice of the Commission, the Department of Customs placed an embargo on export of scrap steel in January, 1916, in order to assure the necessary supply for munition plants. In the latter part of the year export under license was permitted; but the Commission recommended that such export be prohibited after Jan. 1, 1917. Export of turnings and borings was, however, continued in 1917. In February, 1918, the Shell Scrap Department of the Imperial Munitions was organized to purchase from munitions contractors all their heavy scrap at \$24 and steel turnings at \$12 per ton. The steel companies are required to pay this price plus freight charges. On July 12th, 1917, authority to issue licenses for export for scrap steel turnings and borings was withdrawn.

The Commission interested itself in the agitation for refining of copper and nickel in Canada, and recommended that the Government offer inducements that would lead to the erection of a copper refinery here. The Commission urged the Government to insist upon a nickel refinery being established at once, the International Nickel Company having announced that it proposed to establish one. The Commission recommended the guaranteeing of certain securities of the British America Nickel Co., which had announced its intention of erecting refineries for nickel and copper.

The Commission has carried on a number of investigations concerning mineral resources; Professor J. C. Gwillim, Dr. W. F. Ferrier and Dr. W. L. Uglow being engaged for this work. Certain special investigations were undertaken for the Commission by members of the staff of the Department of Mines. The report includes some account of the results of these investigations. Special study was made of chromite, magnesite, manganese ores, molybdenite, tungsten and zinc.

The Commission recommended that development of our mineral resources could be assisted by educating the general mining public in all matters directly concerning the mining of minerals and their preparation for the market. It advised the establishment of additional technical laboratories.

The Commission has undertaken the preparation of an inventory of Canadian minerals required for war purposes. Dr. W. F. Ferrier is in charge of the work of indexing the information obtainable.

As appendices to the report, are published the reports on Steel Scrap Investigations by J. Dix Fraser, Construction and Operation of an Electrolytic Copper Refinery by J. E. McAllister, and Summary of Field Work in British Columbia, Alberta and Saskatchewan by W. F. Ferrier.

The U.S. War Industries Board has announced the commandeering of platinum, palladium and iridium and the fixing of prices of \$105, \$135 and \$175 per oz. respectively. Considering that the United States is depending almost altogether on imports of platinum from countries that might dispose of their product to German agents, it is not surprising that our New York contemporary objects to the price fixing mania. We may be permitted, however, to call attention to the fact that it will be necessary for America to depend upon Russia and Columbia for platinum only so long as the present practice of wasting Ontario's platinum and palladium is continued. Much of the wasting has been done in the United States; where mattes from the Sudbury district are refined.

The decision of the Court of Appeals in San Francisco in the case of Minerals Separation vs. Butte & Superior appears to be that the Minerals Separation patents will not apply when over one-half of one per cent. oil is used. Such a decision will be greatly to the advantage of those using the flotation process.

Hopes for the establishment of an iron and steel industry in British Columbia have been brought nearer to realization by recent action on the part of the Provincial and Dominion Governments. British Columbia has offered a bounty of \$3 a ton on pig-iron manufactured in that Province from local ore and \$1.50 a ton for iron from imported ore. The Dominion Government now offers to purchase all pig-iron produced by blast furnaces erected during the next two years.

U.S. Government Sale of Nickel.

Washington, May 21.—President Wilson has issued a proclamation pursuant to the terms of the trading with the enemy act directing the alien property custodian to sell at private sale, with or without public or other advertisement, 279,232 lb. of nickel, the property of Hammar & Co., of Hamburg, Germany, and Stockholm, Sweden, and other enemies unknown. This nickel is now in possession of the American Dock Co., Tompkinsville, Staten Island, N. Y., where it was warehoused some time ago by the owners. Persons interested in the purchase of this nickel can learn further

details concerning the time, place and terms of sale by addressing the alien property custodian, Washington.

GOVERNMENT ENCOURAGES IRON INDUSTRY.

The Government of the Dominion of Canada has decided upon a policy of encouraging new Iron and Steel Industries in Canada by offering to purchase all pig-iron produced in the country by all new blast furnaces erected during the next two years. It is understood that it will undertake to accept three years' output and that prices paid will be governed by the market conditions at the time.

As to the effect of this decision on the development of an iron industry in British Columbia, Hon. Wm. Sloan, Minister of Mines, in an interview said that the action undoubtedly was very encouraging. He pointed out, however, that the knowledge of what was to be done was not detailed enough to permit extended comment. For instance it was not stated whether the prices to be offered for British Columbia pig iron would be Western prices or Montreal quotations. If the latter the advantage to the producer would be negligible because of the cost of transportation. He was sure, however, that it was not the intention of the Federal Administration to place the manufacturers of this section under such a disadvantage. The Minister pointed out that the object of the Province in offering the bounties indicated was to encourage the Iron and Steel Industry in its initial stages and, because of this, he felt that, possibly, the Dominion Government might have seen its way clear to render assistance to those undertaking to carry the industry further by the refinement of pig-iron which could be done by the subsidizing of the output of rolling mills. This had been the course adopted by the Dominion in its policy of bounties of some years back, which was largely responsible for the laying of the foundation of the very large Iron and Steel Industry of Nova Scotia.

Mr. Sloan concluded:

"As I have stated, the action taken by the Federal Administration is encouraging. It is a recognition of the resources of British Columbia that is very welcome at present when we are trying to make a start in the building up of this very important basic industry. It undoubtedly will have the effect of lending confidence to those contemplating the investment of capital in the exploitation of the iron deposits of the West; assuring them, as it does, of the practical as well as the sympathetic support of both the Provincial and Dominion Governments."

Two news paragraphs published lately in the Daily Alaskan, of Skagway, Alaska, relating to Atlin, which in recent years has been the most productive placer-gold field in British Columbia, are as follows: "On account of the extremely deep snow this year, it is feared that a number of mines in Atlin camp will be unable to operate this coming season, owing to inability of the mine-owners to get in timber. The depth of snow in the woods is so great that it is utterly impossible to use teams." The second paragraph reads: "On account of the high freight rates and the advanced prices on all kinds of provisions and supplies, also on timber, and the increase in wages incident to the shortage of labor, it is believed that a number of Atlin mines will not be operated this season, nor until the war is over and conditions resume a normal status. Many protests are being made, but it is believed that nothing can be done to alleviate the situation."

Some of the Coal Producer's Problems ^{*}

By D. H. McDougall.

On the occasion of our last meeting of the Mining Society of Nova Scotia, I made reference to the part played in this war by coal, and the subsequent course of events has given the general public and ourselves a very lively appreciation of the value of our domestic fuel supplies. We have realized through actual trial and experience the bearing of fuel supply upon our national independence. A combination of labor shortage, inadequate transportation facilities and unprecedentedly severe weather conditions during the past winter caused a fuel crisis in the United States which, but for swift and drastic action on the part of the United States Government, would have brought about a national catastrophe, in which we also should have been involved.

We have realized that no nation can stand alone unless it possesses an adequate fuel supply within its own borders. Fortunately for Canada, the Republic to the south of us is our ally and companion in arms, and Canada has received most generous consideration from the United States in this matter of fuel supply.

Canada Will Have Same Treatment as United States.

Recently in Ottawa a representative of the Fuel Administrator of the United States told the assembled coal miners, operators, and transportation men of Canada, that Canada would receive the same treatment from Dr. Garfield as though it were part of the United States itself. We were told that in the distribution of the available coal supply of the United States the boundary line between the two nations would be absolutely ignored, and that so far as the distribution of this most vital munition of war was concerned, North America would be looked upon as being one nation with one common aim.

Fuel Supply and Transportation.

We have learned the intimate connection between fuel supply and transportation facilities. In this country of vast distances they are in fact practically indistinguishable one from the other. The problem of the utilization of the great bituminous and lignite fields of the Canadian West—as was abundantly demonstrated during the recent Fuel Conference at Ottawa—is altogether one of transportation.

I may remind you that the coalfields of Nova Scotia remained undeveloped, and the industry, which we so largely represent, did not emerge from its small beginnings until the transportation problem was solved, and the St. Lawrence market was opened to Nova Scotian coal by the provision of modern coal freighting vessels and of modern loading and discharging plants.

At the present time the enormous increase in the percentage of coal consumed within the Province of Nova Scotia itself, accompanied by declining outputs, has obscured the present importance of transportation in our own particular case; but this problem will revive and will face us in greater intensity whenever we seek to regain the St. Lawrence market as an outlet for Nova Scotian coal.

We have further learned that the value of fuel, and all questions of comparative excellence of fuels become considerations of a secondary character during times of fuel scarcity. We are learning to make the best of our own natural resources, and when fuel such as anthracite, possessing the desirable features of smoke-

lessness and high calorific value, cannot be obtained, we must perforce turn our attention to the utilization of such fuels as peat, lignite, and even wood.

The Fuel Controller of Canada has announced that it is extremely unlikely that United States anthracite will be available next winter in the prairie territory west of Winnipeg, which means that bituminous coal and lignites will have to be used as substitutes.

It is not an unmixed evil for a people so virile and enterprising as our own people to be thrown back on their own resources, because it naturally leads to development and progress and probably the discovery of unsuspected excellences both in our natural resources and in our ability to make the best of them.

I may, in passing, point out that the shortage of anthracite is not a mere phase originating in present conditions. No country in the world, unless perhaps it is China, has been so favored in the possession of anthracite resources as the United States. But that the anthracite fields there are approaching a period of comparative exhaustion is evidenced by the fact that very thin seams of anthracite are to-day being worked, seams which in the past it would not have been deemed worth while to operate.

The Intrinsic Value of Coal.

Another thing that we are learning is the intrinsic value of coal itself. Probably in regard to no basic raw material has there existed so widespread a misconception as in the case of coal. This misconception has not been confined to the general public, but it has extended to those whose daily business is the production and sale of coal.

The Selling Price Has Been Too Low.

The ultimate factors entering into the cost of coal have not been fully understood, and, without entering into detail, it may be briefly stated that coal has, in the past—both in Canada and in the United States—been sold at prices below the actual cost of production, when such cost is considered over the whole life of any given coalfield. Further, it may be stated that the material value of coal itself has been underestimated, and perhaps no raw material has been so wastefully and unscientifically consumed in the past.

We are learning that the price of coal is not a deciding factor in days of fuel scarcity. The important thing, the paramount necessity is to produce the coal; to produce it as cheaply as possible, but above and beyond all other conditions, to produce.

The United States has experienced the sharpest lesson in this connection. No small part of the barely averted catastrophe of last winter was due to the arbitrary fixing of coal prices in the summer of 1917. Any action in the fixing of prices which ignores the essential factor of production and does not simultaneously with the restriction of prices, provide for the stimulation of production, is a mistake and defeats its own object. In the case of a raw material of such fundamental and vital importance as coal, all government action should have as its first and guiding motive the increase of production.

Efficient Use of Men.

Increase of coal production does not necessarily mean the opening of new mines, but rather the reverse. There has been, throughout North America, a general reduction in the working force at the collieries. In

Nova Scotia this reduction of workmen has largely concentrated upon the actual miners and producers of coal, as would naturally happen, because the producing class at a colliery—by a process of natural selection—includes the men most fitted by physique and mentality for military service. This withdrawal of the most efficient members of the working forces has not been peculiar to Nova Scotia, but is a noticeable feature throughout all the coalfields of North America.

Under these circumstances of labor shortage, of a selected character, the obvious remedy for the unbalanced conditions which it has brought about is the concentration of the remaining workmen in the collieries best equipped to give the greatest production of coal. The most noteworthy feature of the existing labor situation at the collieries is the inefficiency of operation brought about by the unbalancing of the forces referred to, and concentration is the remedy.

Not only is concentration desirable from the point of view of productive efficiency at the collieries, but it is also necessary to conserve the transportation factor. The fewer the points from which transportation is required and the greater the tonnage which can be moved from these points, the less will be the call upon the motive power of the railways and upon shipping.

In view of the insistent calls of the Army for more and still more men, it appears quite hopeless to look for any large increase of coal production arising from the provision of additional employees, and, as in the case of the fuel itself, we must make the best of the man power we have.

Production of Coal is of Vital Importance.

The coal operators are fully alive to the necessity of increasing production where it can be achieved by the use of mechanical devices, and the labor shortage has already brought forth mechanical devices which will play an increasingly important part in the future development of the coal industry. Unfortunately, this avenue of possible increase of coal production is restricted by the difficulty of obtaining delivery of machinery, so for the present the only way by which coal production can be stimulated is that every man employed in the industry—no matter what his position—shall work to the full extent of his ability.

Our chief incentive to hard work should be the knowledge—and here you will pardon me if I repeat my statement of last year—that, “no single department of the machinery of modern warfare can move or act without coal.” Those of us who help in one way or another in the production of coal are privileged in that we are able by our personal endeavors to help or hinder in the prosecution of the War. In view of the critical condition of military affairs at a time when we are approaching the end of the fourth year of the struggle, I believe I voice the feelings of us all when I say that we need no further spur.

The metalliferous mining of the Nicola District, British Columbia, is improving. A railway is being built to the Canada Copper Company's property on Copper Mountain, near Princeton, B.C., and a concentrator is being installed.

The Voigt's Group of Copper Claims, Copper Mountain, have been bonded by the Canadian Mining, Smelting and Power Co., and soon will become one of British Columbia's producers.

CORRESPONDENCE.

Bore Hole Drilling.

Editor Canadian Mining Journal:

Sir,—In reading over the articles by Mr. Hitchcock, Mr. Harrington and Mr. Stone, on the merits of the various diamond drill core-barrels, it is rather surprising to note that the return water principle is discussed as if it were something new and better than the standard barrels. Mr. Harrington, who is well known to most of us in the diamond drilling business, is thoroughly qualified to give an opinion on the subject, as he has had a world of experience in drilling under widely varying conditions. He seems to have voiced the opinion generally held by drillmen; in saying that when conditions are such that it is desirable to use a double tube barrel, the ball bearing barrel without the return water feature is unquestionably the best. This barrel fulfills all the requirements of an efficient double tube barrel and the same cannot be said of any other type.

The double tube barrel was designed primarily to protect core from the washing effect of moving water. This is by far the most important consideration in double tube barrel design. The next most important improvement is the provision for preventing the rotation of the inner tube, thus eliminating the vibration and friction against the core and preserving it in the best possible shape. This, as has been explained, is accomplished by suspending the inner tube on ball bearings. In formations that are difficult to core, and where the maximum core recovery is of utmost importance, no other type can compare with it. It is true this is the most expensive barrel on the market; but Mr. Stone's statement that it is short lived is contrary to the writer's experience. Due to the almost entire absence of friction on the inside, there is little wear except on the outer barrel. The outside wear is probably less than on the other types, because of less grinding of core with the consequent wear from cuttings. In soft formation the regular practice for the past few years has been to dispense entirely with the single tube barrel and run only the double tube, because of the increased progress that can be made. A double tube barrel under such conditions will run a year or more, which is as much as any barrel will do.

The rigid type return water barrel, which Mr. Stone states is as good or almost as good as the barrel described above, fails to fulfill the two important functions of a double tube barrel in that it does not protect the core from moving water and does not protect it from friction or vibration. It probably would be better described as a modification of the single tube rather than a double tube, as the only difference in the action on the core is that the water flows upward around the core instead of downward. The friction remains the same as in the single tube.

While this barrel does not give the results that a regular double tube barrel does, it has some advantages when used in broken formation. When the single tube barrel is used, while the upward flow of water will wash away soft core, it will tend to loosen broken particles of core that become bound in the barrel and better progress can be made. It would seem that a barrel possessing this advantage would be used extensively in the Lake Superior district, where the rock is hard and more drills are used than in any other section of the world. The reason why it is not more extensively used, is because the return water feature is considered dangerous by contractors and drillmen in that section. Drillmen must be constantly on their guard against getting

the rods stuck. Invariably, sticking is caused by failure to wash away the cuttings from the outside of the bit and barrel. When this occurs on an ordinary barrel the pump stops and the water ceases to return at the top of the hole, an instant warning to the drillmen. With the water returning through the inner tube, it is difficult to determine how much, if any, water is passing up around the outside of the barrel, so that a bit may be stuck while the water is returning. This frequently results in not only the loss of rods, core-barrel and diamonds; but of the hole as well. It is rather common practice amongst runners, when this barrel is furnished, to plug the upper hole in the barrel; thus preventing the water returning through the inner tube and eliminating the danger of sticking. With the hole plugged, the barrel is the same as the simple rigid type. The fact that this is often done and that runners claim better results is not a very strong recommendation for the return water barrel.

From a drillman's standpoint, all drilling is either hard rock drilling or soft rock drilling and there is rather a distinct line between the two. Hard rock comprises the metal producing formations while soft rock means such formations, as fire-clay, salt, sulphur, asphalt, coal, gypsum, etc. The standard barrel for the former is the small single tube and for the latter the large double tube ball bearing barrel. If conditions are such in the so-called hard formations that it is desirable to use a double tube barrel, better results can be obtained by employing the soft rock practice of large hole and proper double tube barrel rather than by using small fittings not adapted to such conditions.

The foregoing opinion is based on twenty years experience in many parts of the world and is substantially the same as the views held by Mr. Harrington and most other experienced drillmen. Furthermore I believe it is in line with the practice of the Sullivan Company, who make all the barrels under discussion. As they are considered the leading authority on the subject it would be interesting to have their ideas.

Yours etc.,

J. G. GRATTAN.

Flower, Ont., May 22, 1918.

BLASTING COAL IN NOVA SCOTIA MINES.

Up to within very recent years the blasting of coal in Nova Scotia mines was accomplished by loose black powder, fired by squibs, but this practice has very properly been abandoned. In the damp mines compressed powder, or "pellets" are used. The charge is fired by an ordinary squib, sometimes ignited by a wire heated by contact with the safety lamp flame, and inserted through a small hole specially bored in the lamp glass. The use of squibs is with good reason coming to be regarded with disfavor, and powder fuses fired by electric batteries are being introduced. In the dry and dusty mines, or in mines where gas occurs, so-called "safety" or "permitted" explosives are used, as "Excellite" or "Monobel." These explosives are, of course, fired by a fulminate of mercury detonator, and electric battery. The quantity of explosive used varies with the nature of the seam, but from 4 to 7 tons of coal produced per pound of powder used, may be taken as usual practice.—F. W. G.

Mr. Maurice M. Summerhayes, formerly manager of the Porcupine Crown Mining company has been made manager of the Blueston Copper Mining company, Nevada, and has already left for Nevada.

PRINTED COPIES OF PATENTS.

By H. A. Budden.

Sir Robert Hadfield, head of the firm of Hadfield, Limited, Sheffield, in a recent address on Patent Law Reform, made the following statement:

"As an example of the antediluvian policy of our Empire on this question an Englishman in this country cannot get a copy of a Canadian Patent without sending to Canada, and even then he gets only a typewritten copy, as patent specifications are not printed there."

This condition of affairs in the Patent Office, Ottawa, is one that demands immediate attention.

The Canadian Patent Office have issued over 180,000 patents and Canada ranks seventh among the countries of the world issuing Patents for Inventions.

A copy of a British Patent costs 8 pence, while the U. S. Patent Office sell copies at 5 cents apiece.

A copy of a Canadian Patent costs on an average over two dollars and can only be obtained after considerable delay.

In the U. S. Commissioner of Patents' report to Congress for the year ending December 31st, 1917, the following figures are given relating to this subject.

Printed copies of specifications and drawings of Patents to the number of 2,511,082 were sold at five cents each, bringing to this Office on this account, \$125,554. For 1,277,184 copies sold to libraries the Office received \$1,612. The total received from the sale of copies of Patents was \$127,166.

Copies to the number of 1,097,550 were shipped to foreign governments and 142,640 copies were drawn for office use. The total number of printed copies of Patents distributed during the year was 5,354,136.

These figures show that there is a great demand for printed copies.

The public is interested in the publication of Patents because it has the right to know the terms of the grant of a monopoly in order to avoid infringement while the monopoly exists, and it has also the right to know what has become public property when that monopoly ceases.

The patentee is interested in the publication of patents as he would readily purchase a number of copies of his patent, to assist him in exploiting his invention.

The Patent Office is urgently in need of printed copies not only to supply the examiners' files, but also to fulfill an agreement with the U. S. Patent Office to exchange copies.

In Great Britain and the United States the libraries in all the great centres contain copies of patents for reference. In Canada it is necessary to go to Ottawa to make a search and even then the cumbrous typewritten copies, which are not properly classified, make a search difficult and tedious.

The Canadian Patent Act as it now stands provided for the printing of specifications and drawings in Section 63, subject to the approval of the Governor in Council.

Undoubtedly it will take a long time to print the 180,000 patents which have been already issued, but that is a matter for special consideration.

There is no doubt, however, that the system of printing specifications and drawings should be adopted at once and thus prevent the increase of arrears.

Canada has reached such a stage in her development that she should endeavor to be among the progressive nations, particularly in matters that concern her intercourse with other nations. Her present time of rapid industrial and technical advance demands a change from old methods which may have been suitable for a young country.

Tungsten Ore Deposits Near Falcon Lake, Man.*

By Justin S. DeLury.

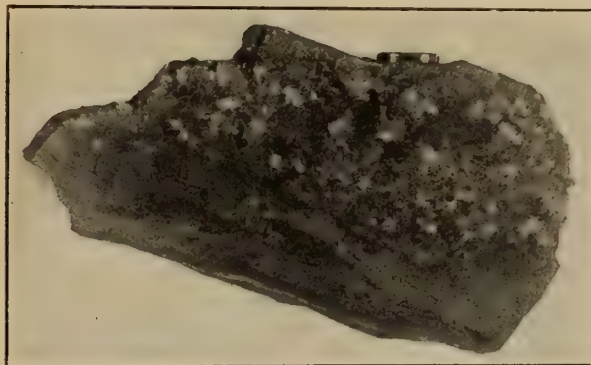
The Falcon Lake District is part of an area which lies to the northwest of Shoal Lake and near the Ontario Boundary and which was prospected for gold several years ago. Throughout this area are signs of prospecting in the form of old prospect holes, stakes and claim lines. A few of the old claims are still held, but most of them have lapsed. A part of the District adjacent to Falcon Lake and that part which is of interest at the present time in connection with the tungsten finds was prospected last year for molybdenite and a brief report* appeared describing the occurrences of that mineral.

When the molybdenite deposits were examined, no signs of the presence of tungsten minerals were seen, though they were looked for in the pegmatites and associated quartz veins. Last winter some prospectors

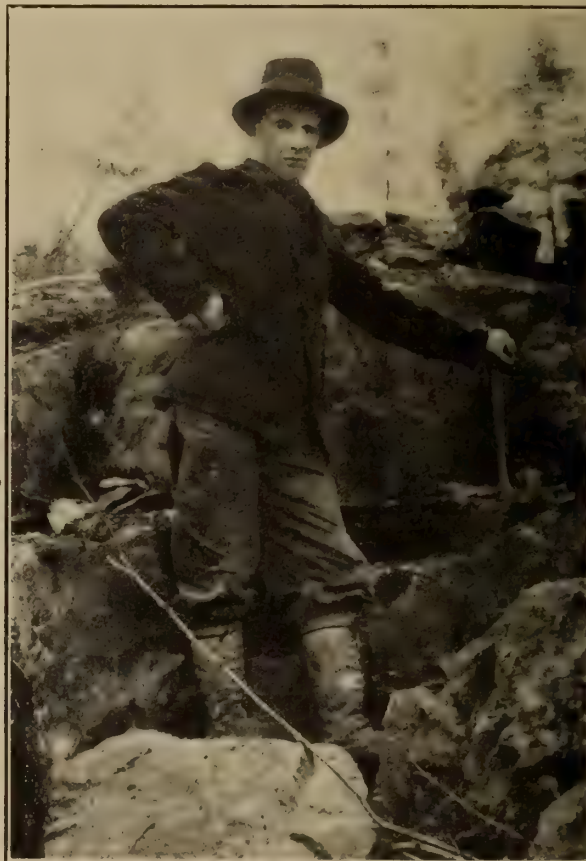
midway between the main line of the Canadian Pacific Railroad and the Greater Winnipeg Water District Railroad. By good canoe routes and trails the prospects can be easily reached in a half-day from either railroad. Should the district go ahead as a shipping camp, means of transportation could be easily arranged. The accompanying map shows the location of the field and the means of access.

The principal geological features of the area were brought out in the above-mentioned report on molybdenite, so that it will not be necessary here to give more than a brief outline. The map shows the prominent geological outcrops with their approximate boundaries.

The principal rocks of the area fall structurally into two groups: a series of ancient schists and a later in-



Falcon Lake tungsten ore.
(White crystals are scheelite.)



J. MacMillan.
Discoverer of the scheelite deposit near Falcon Lake.

went into the District to stake more claims, and one of them brought out some fragments of rock, the weight of which attracted his attention. In March of this year these were recognized as pieces of high-grade tungsten ore; consisting of scheelite, a calcium tungstate, embedded in a mass of epidote crystals.

Two short visits were paid the District to examine the tungsten occurrences, and though little work has been done to show-up the properties, sufficient information was gathered to furnish the following brief paper giving a description of the ores and their manner of occurrence.

Compared with the positions of most Manitoba prospects, these are very favorably located, lying about

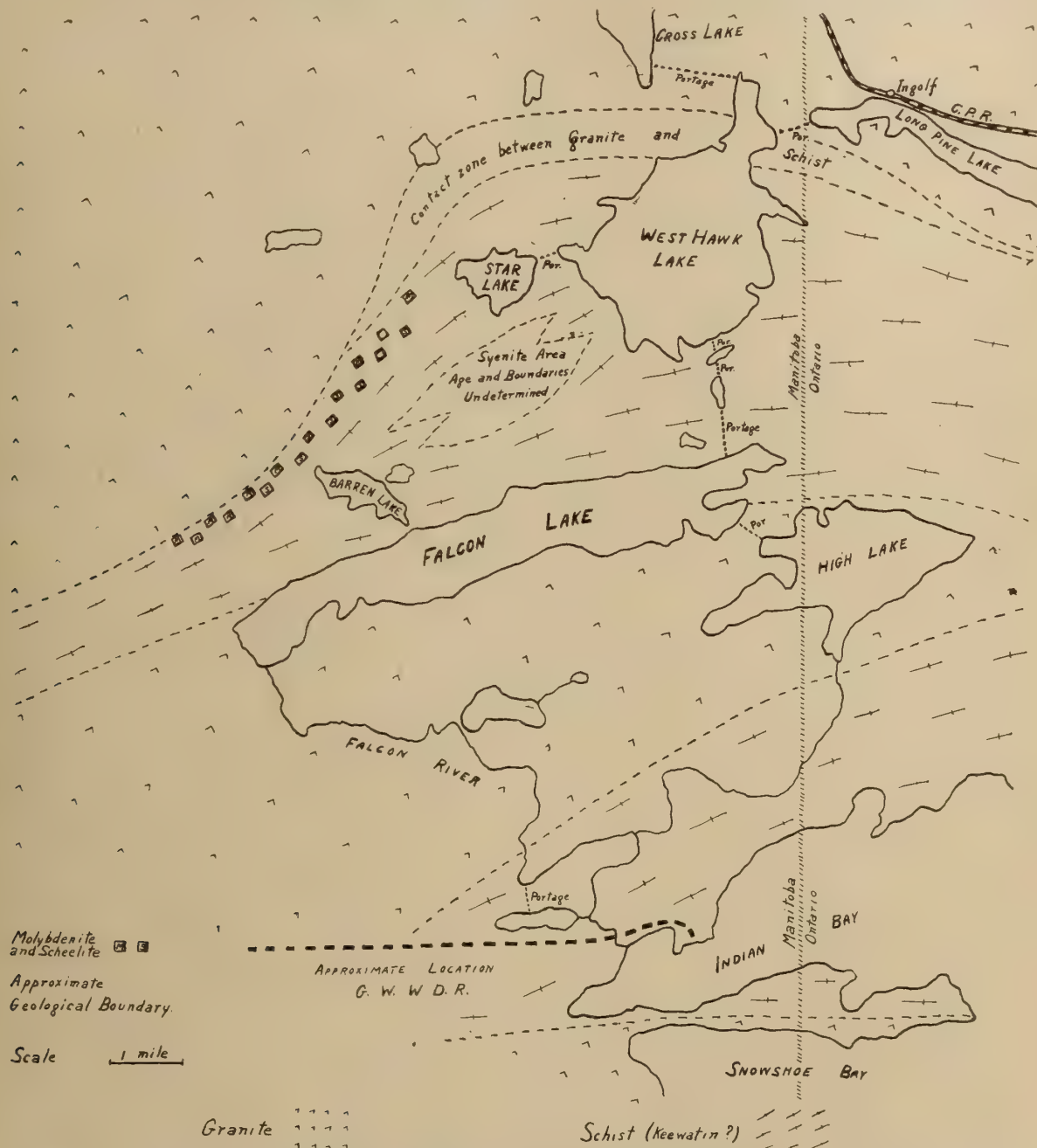
intrusive granite series. The schists have evidently been derived by processes of compression, shearing and granite-intrusion from basic lavas and intrusives together with some sediments and small amounts of acid igneous rocks. The schists appear as belts between areas of intrusive granite and the schistose layers are vertical, or nearly so, and parallel to the granite walls on the boundaries. The belt of schist containing the molybdenite and scheelite deposits appears to be an old synclinal trough, a residual part of formations which probably covered the granite throughout the area in former times.

It is difficult at the present time to form any con-

*J. S. DeLury, Can. Min. Journal, Dec. 1, 1917.

ception as to the depth of the schist in this trough; but from their extent and position it is reasonable to assume a considerable depth in most places. The granite in most cases shows an almost vertical wall against the schists. In parts the contact shows a wide zone of alternating wide bands of schist and granite;

and stringers in the schist. The more prominent of these minerals in connection with the scheelite deposits are epidote and garnet. Molybdenite was seen in several places in stringers in the schist near to, but not directly associated with, the scheelite. Several other contact minerals were noticed, but there has



Sketch Map of Falcon Lake District, Manitoba, showing molybdenum-tungsten areas, April, 1918.
Compiled from various maps and private notes

this type grades to another in which a rather sharp contact appears.

The typical granite is coarse-grained with large, reddish-weathering feldspars embedded in a finer-grained matrix of quartz with a small amount of mica. In places are signs of a finer-grained contact granite, and near the contact generally appears a rough, gneissoid banding, which is probably due to flowing, but may be partly due to shearing after solidification.

In the later stages of granite intrusion a magmatic extract from the cooling mass of granite furnished materials for the molybdenite-bearing pegmatite dikes and for high-temperature vein deposits which carry the scheelite. Many minerals which are characteristic of high-temperature deposits were developed in veins

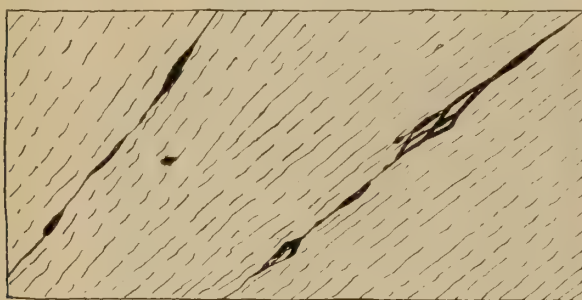
been insufficient time to determine them exactly; some of them suggest feldspar, zoisite and scapolite. There is little evidence so far of the mineralizers commonly associated with granitic intrusions, such as boron and fluorine. Sulphur is present in close but not intimate relation with the scheelite; appearing in small quantities of pyrrhotite.

Other types of ore are found in the District, usually farther from the contact than are the scheelite and molybdenite. Their connection with the same intrusion of granite has not been established, and is not suggested. Free gold has been found in several quartz stringers and silicified rock bands which usually contain some of the common sulphides. Some of the sulphides commonly noted in the area are: pyrite,

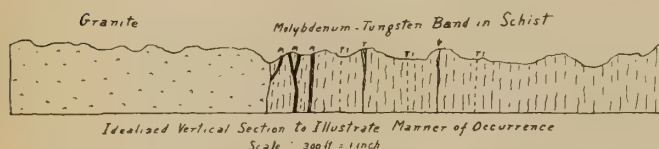
pyrrhotite, chalcopryrite, arsenopyrite, sphalerite and galena. Some veins of magnetite two to four feet in width and carrying varying quantities of pyrite and chalcopryrite were also seen.

Mode of Occurrence of the Tungsten Ore.

The manner of occurrence of the scheelite orebodies is best brought out by the accompanying sketches. Very little work has been done; there has been no stripping and only one deposit has been opened at the surface. Indications are that the zones which carry the scheelite will be fairly continuous, some of them probably for several hundreds of feet, though tungsten values may not be persistent throughout the length of the zone. Good ore was seen on some of the more persistent zones at several points. To get an accurate idea of continuity of values, blasting of the rock is necessary, since the scheelite has undoubtedly weathered from the immediate surface and from those places which are loose enough to be attacked by a prospector's pick.



Surface plan illustrating nature of outcrops.



Vertical section illustrating manner of occurrence of ore.

The one deposit which was opened gave very encouraging indications for the others. Ore occurs in a zone of from three to five feet in width. The epidote-scheelite ore occupies in places roughly a quarter and in others a half of the zone mass; the ore would have values commonly corresponding to from five to fifteen per cent. scheelite. This body is lenticular in shape and is made up of a reticulated mass of stringers which have resulted from replacement of the country rock or of some previously deposited vein-material along fractures and fissures. This lens, about twenty-five feet long, passes into stringers at each end and under heavy overburden so that unfortunately in this one case where the vein has been opened, the vein cannot be traced until stripping has been done. However, as most of the other outcrops are in readily traceable zones, chances are good that this excellent showing will be traced and will show values elsewhere. If the depth of this lens is commensurate with its length, at least one carload of shipping ore should be obtained.

In most of the deposits so far found, epidote is the characteristic gangue mineral. It shows various shades of green color and occurs as granular masses and as aggregates of large crystals. The interspaces between the crystals are occupied by irregular masses of scheel-

ite which vary in size from quite small grains to masses up to an inch in length; some plates are also found apparently filling cracks, many of them showing rough faces with an area of several square inches. The scheelite is typically pure white in color, but is occasionally found with other tints, most commonly a pale pink or red. In the more northerly of the prospects, garnet appears to be a more important gangue mineral than epidote, though even here some epidote was noticed in most cases. The ore in these prospects is typically a mass of fine-grained deep red or brown garnets with small grains of scheelite interspersed between them. None of these garnet-bearing deposits have been opened, so that an idea of values cannot be given. Some rich samples were chipped off close to the surface. In all cases the scheelite was in small grains.

Ore in Band in Schist Parallel Granite Contact.

The finds of tungsten so far made are confined to a band in the schist running parallel to the granite contact. The band is about three miles in length and about a half-mile in width. While practically all of this belt has been staked, there is no apparent reason why the tungsten-bearing area should not have greater limits and further prospecting is apt to prove a wider field. It might be recalled here that very little prospecting has been done in this district and up to a late date new finds were being made. Five or six distinct discoveries have been made and tungsten tests have been obtained from several other points within the belt.

Bright Prospects as a Tungsten Field.

Prospects are bright that a small production will result from the development of known bodies; in fact, with proper care, production should pay for prospecting. The district is fortunately situated and considering the extensive showings which have resulted from a very small amount of work, indications are promising for a new Canadian tungsten field.

Development of Molybdenite Properties is Also Promising.

This paper would be incomplete without some mention of the molybdenite deposits near Falcon Lake and belonging to the same belt. Recent development has been very encouraging. Two men working for three days under adverse conditions and breaking in from the surface bagged at least seventy-five pounds of pure molybdenite. One solid mass of the mineral was estimated from measurements to weigh at least twenty pounds. From the showings in this area there appears to be no reason why Manitoba should not soon take its place as an important producer of molybdenite.

The Whitehorse Weekly Star recently printed the following information concerning one of the mines in Whitehorse copper camp, in Southern Yukon: The body of rich ore struck recently in the Copper King mine continues to grow in importance. With depth the ore body has steadily widened until now there is a 5-foot lead of copper glance and bornite which assays from 40 to 60 per cent. copper and 13 oz. silver to the ton. Manager Whitney is having hauled to Whitehorse and loaded on railway cars a quantity of this high grade ore and this will shortly be shipped to an outside smelting works.

Mr. T. Regnall, formerly manager of the Dome Lake Mining Company is now on the staff of the Hollinger Consolidated. Mr. Regnall was succeeded by Mr. Douglas Mutch.

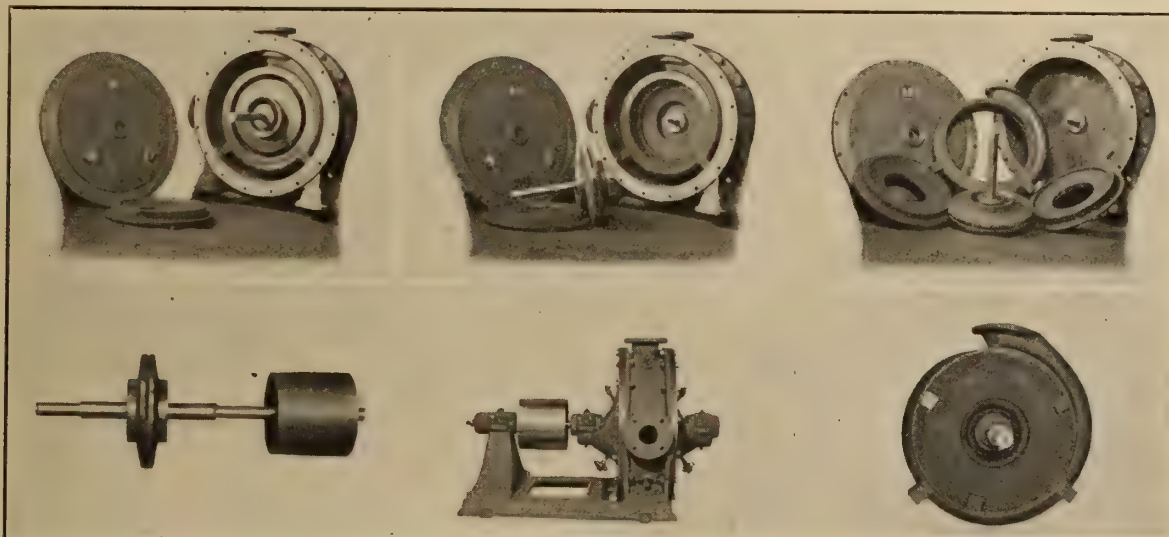
THE ROSS BOX PUMP

The Ross Box Pump, for which patents have been granted, is an entirely new departure in centrifugal pump construction, and will be welcomed by the engineering profession. By the courtesy of the makers we are enabled to show our readers some interesting photographs and illustrations of this pump.

In this pump all cored suction passages and intricate castings disappear. The inventor has reduced the centrifugal pump to its simplest elements.

There are three principal elements in a centrifugal pump—the impeller, the pressure case round the impeller, and the suction box—and when these three elements are made in their simple form and placed in

The centrifugal pump is now the most widely used type of machine for dealing with mixtures of solids and liquids, and it has almost entirely supplanted the tailings wheel, bucket elevator, etc., for this work. For the hard service involved, the ordinary centrifugal pump, lined inside with wear-resisting metal, was developed; the main casing of the pump being sectionalized to provide more or less easy access to the lining. On account of the difficulty of fitting liners into a well-designed volute casing, only the crudest form of single suction centrifugal pump has been found practicable up to the present. The efficiencies attained are very low and there is present the inherent disadvantages of end-thrust. Attempts to develop the balanced double suction type for this service have hitherto been unsuccessful on account of the complexity of the



The Ross Box Pump.

a certain relation to each other, we have the new pump. The impeller and pressure case occupy a position in the centre of the suction box and are entirely submerged or surrounded by the liquid being pumped.

A glance at Plate 1 will show the simplicity of the machine thus achieved and a little reflection will show the pump designer the great possibilities opened up to him by the new construction. He will see that he can go ahead to maximum efficiency of impeller and pressure volute without worrying about what will happen to suction passages, main case, and glands. If he encounters special conditions of service, he can proceed to alter his impeller and volute patterns to suit. If the pump is required to handle clear water he instructs his founder to make these two elements of the usual cast iron with close clearances. If the pump is required to handle gritty water, slimes or sands, he instructs his founder to make these parts of chilled iron or steel, and tells his machinist to grind the necessary clearances. The pulp or fluid in the suction box moves at a very slow speed and experience has shown that practically no wear takes place inside it, even when very thick granular material is being dealt with.

When handling pulp it is necessary to run clean water into the glands. Pipe connections are provided for this purpose, leading to the water seal rings in the stuffing boxes. Special care has been taken in the design to prevent these water seal rings from being pushed beyond the water supply apertures. A special test pipe and valve are also provided to show that water is actually flowing to the water seal.

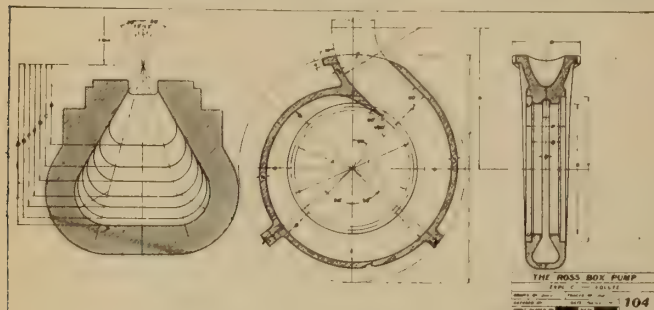
liners involved. In the Ross Box Pump these difficulties have been overcome, and by means which may be summarized as follows:

- (1) Complexity of parts has been overcome by placing the impeller and wearing parts in the centre of a suction box, instead of the usual practice of making a complete pump casing and then lining it. The suction box thus takes the place of the main pump casing in the usual centrifugal pump.
- (2) End thrust is obviated in the Ross Box Pump since the impeller is of the balanced double suction type. With this type of pump it is equally easy to make the impeller single or double suction.
- (3) The arrangement of the Ross Box Pump allows the designer complete freedom to secure maximum efficiency at all points. Efficiencies equal to the best type of water pump are attainable without sacrificing simplicity of parts.
- (4) The interior parts are simpler and more accessible than any single suction lined pump yet developed. It is necessary to open one door only, when every wearing part is immediately and easily available, and all this is done without disturbing the suction and delivery piping. There is no other pump for which this can be claimed.

A consideration of the foregoing will show the engineer that this new type of pump combines simple and strong construction with minimum weight and simple machine work. He will also appreciate the final degree of excellence in the disposition of the shaft bearings a feature directly attributable to the new construction. As a pump which will deal equally well with water as well as sand and slime pulp, its

application as a standard all-service pump will make a strong appeal to pump users.

In these days of standardization, it is interesting to note how far this has been done in the case of the Ross Box Pump. In view of the fact that manufacturing should be done at various centres and the necessity of making parts interchangeable, each detail drawing was made the subject of a special study.



All duplicated and non-essential dimensions were rigorously excluded and letters A B C, etc., were then substituted for the dimensions. The part in question was then drawn out full size for all sizes of pump and key dimension lists corresponding with the letters were obtained. Thus one drawing with the key dimension lists takes care of that particular part for all sizes of pump. In all, there are ten drawings 12 in. by 24 in. having eight keys each. A reproduction of one of the drawings is shown.

Further particulars regarding this remarkable line of Pumps may be obtained from The Ross Engineering Company, 908 Eastern Townships Bank Building, St. James Street, Montreal.

WILL DISCONTINUE MINING GOLD ORE.

A very significant notice was issued recently by the Canadian Consolidated Mining & Smelting Co. to its employees. It follows:

"Large increases in the various items entering into the mining and smelting of the Rossland (B.C.) ores, such as wages, cost of explosives, coke, steel, general mine and smelter supplies, without adequate compensation in values by way of increased metal prices, coupled with increased taxation, has made it necessary for the company to suspend shipments from the Rossland (B.C.) mines indefinitely.

"An endeavor will be made to keep a small force on development work, and to place the remainder of our Rossland employees at the smelter, the Sullivan mine, Kimberley, and other lead-silver properties of the company."

The explanation of the above is found in the fact that Rossland ores contain but a few pounds of copper to the ton, its values being mostly in gold. It is the intention, therefore, to make shipments just sufficient, with the augmentation of customs ore, to keep one copper furnace at the company's smelter in Trail B.C. in operation. One of the company's officials put it very succinctly when he said:

"As a gold dollar will hardly buy half as much as before the war, there appears to be no great advantage in mining gold ores at this time—especially when almost every variety of mining cost has doubled and more."

POTASH.

During 1917 there was produced and marketed in the United States 126,577 potash products containing 32,366 tons or 26.4% of potash. The average selling price was \$4.26 a unit or \$4.26 a ton for each one per cent. K₂O in the material.

British Columbia Offers Bounty for Iron

"The Iron Bounties Act," which binds the Province of British Columbia to give a bounty of \$3 per ton on all pig-iron manufactured from British Columbia ore in British Columbia and \$1.50 per ton on all pig-iron manufactured in British Columbia from foreign ore, is easily the most important mining legislation passed at the recent session of the Provincial Legislature. It went through the House without difficulty, the consensus of opinion being that it was good policy and a very opportune move on the part of the Government to encourage the development of the latent and admittedly large deposits of iron of the Province.

Another section of this Act anticipates the employment of electric furnaces in the treatment of British Columbia ores, and provides for the bonusing, on the same basis, of the output of such plants. It reads:

"Bounty, as on pig-iron under this Act, may be paid upon the molten iron from ore which, in the electric furnace, Bessemer or other furnace enters into the manufacture of steel by the process employed in such furnace; the weight of such iron to be ascertained from the weight of the steel so manufactured."

It is interesting to note here that the Government has decided to retain an expert to make an examination of the iron ores of British Columbia and submit a report on the practicality of handling it by the use of electric furnaces. Hon. Wm. Sloan, Minister of Mines, addressing the Legislature in support of the "Iron Bounties Act," said in this connection:

"I may say that, with the development of the iron and steel industry throughout the world, development which has been more marked in recent years because of the pressure brought to bear by the war, new processes have been discovered and proved through experiments, which make it practical and a commercial proposition to handle the magnetites of British Columbia without the admixture of hematite. I may add that the Government is fully alive to the importance of this from the standpoint of the industry in this Province, and has engaged an Eastern Canadian expert to visit British Columbia at an early date for the purpose of making inquiry and submitting a report on the practicability of treating our ores by means of the processes to which I have referred. I am confident that his investigations will be of the utmost value to all British Columbians interested in the establishment of this important basic industry in Western Canada."

The Minister, referring to the tonnage of iron ore available, said:

"I may say that in considering this question I have had prepared for my information a number of reports by various experts on our iron resources and now I think is the proper time to refer to them. One engineer opens his statement thus: 'In attempting to give any description or idea of the iron ore deposits of the Coast of British Columbia one is immediately confronted with the fact that, almost without question, none of the known deposits has been worked other than superficially and few have received any further development than very shallow open-cuts, tunnels or shafts.'

"He then goes on to point out that it is estimated for Vancouver and Texada Islands alone, the actual and probable ore totals over 5,000,000 tons, which would be sufficient, if we take the requirements of a blast furnace as being 200,000 tons of ore a year (equivalent

to about 100,000 tons of pig iron) to supply the requirements necessary for twenty-five years.

"Another engineer gives a rough estimate of the tonnage of magnetite iron ore on the southern British Columbia coast as far as he has examined as follows:

	Tons.
Actual Ore	630,000
Probable ore	6,050,000
Possible ore	10,500,000

"To these figures he adds the following statement: 'This would undoubtedly be largely increased by further prospecting.'"

Of the quality of the British Columbia iron ore Hon. Mr. Sloan spoke very optimistically, saying in part:

"The ores referred to as on the Coast Islands are exclusively magnetite iron ore. Those magnetite deposits are always replacements of limestone and are found in or near limestone deposits and the ores are apt to carry some lime as gangue matter, rather an advantage from an iron smelter's point of view. The iron content of these ores will run from 50 to 65 per cent. iron on commercial samples; the sample of a 600 ton lot of ore from Texada Island is given in the tenth census of the United States as having run 65.7 per cent. iron. Of course many of the deposits are not as free from gangue as the Texada Island deposits and parts of these deposits might require magnetic concentrating—a cheap process. It would be safe to count on two tons of average ore producing one ton of pig iron."

After dealing with the hematite and limonite deposits of the Province rather exhaustively, Hon. Mr. Sloan touched on the question of fuel, pointing out the remarkable resources of the Vancouver Island, Nicola Valley, and Crowsnest Pass Fields in respect of coal. He said that the coking qualities of the Crowsnest Pass coal had been thoroughly demonstrated and that while the product of Vancouver Island was not looked on as being as good as the former for that purpose the fact that the Granby Consolidated Mining & Smelting Co., after extensive experiment, was opening a mine on the Island, the output of which was to be treated in by-product ovens for the production of coke for use in its smelting centres at Anyox and Grand Forks, B.C., was ample proof that the Coast coal is capable of making first-class coke.

The problem of markets formed the concluding theme of the address, the Minister taking the position that, while it was not claimed that there is at the present time a market in British Columbia sufficient in size to absorb the whole product of a commercial unit of an iron blast furnace, it would be provided by the stimulation of such industries as are based on the use of iron and steel and which are essential to the economic development of the country.

The customs smelter at Ladysmith, B.C., is to be blown in on or about the 20th of June next, according to Mr. W. J. Rattle, general manager of the Ladysmith Smelter Company, who returned to the Pacific Northwest recently from New York where satisfactory financial arrangements were made for the resumption of operations. This smelter was active for a time last year, but closed down in order to permit a business re-organization and to provide for a continuous supply of ore. Both of these objects, Mr. Rattle, whose headquarters are in Seattle, says have been accomplished.

PERSONAL

Dr. H. M. Auri, for some thirty years on the Geological Survey Staff at Ottawa, has been doing war work at the British Embassy, Washington, D.C., since January, 1917. He is now "in charge of war metals and minerals" at the Embassy.

Mr. George L. Fraser, for some time an employee of the Granby Consolidated Mining and Smelting Co., has been transferred from the Company's smelting centre at Anyox, B.C., and has taken over the duties of general manager of the company's new collieries on Vancouver Island. He will have associated with him as Mine Manager, J. W. Powell, late of the Canadian Consolidated Coal Co., of Kentucky.

Mr. J. W. Montgomery, formerly mine manager of No. 7, Canadian Collieries (D) Ltd., has assumed the duties of mine manager of Nos. 5 and 6, while Mr. J. G. Quinn, formerly in charge of the two latter mines, has gone to No. 7.

Mr. Alex. Sharp has been appointed mine manager of the Colman Collieries, Princeton, B.C., which have been re-opened. It is understood that considerable development work is to be undertaken.

The Canadian Collieries (D) Ltd., has opened its No. 5 Mine, and Mr. D. Morton has been appointed Overman. He was Head Overman at No. 4 Mine, Extension, which has been closed down.

In the re-organization of the Fleming-Merritt Collieries, under the firm name of The Fleming Coal Company, Mr. Joseph Graham has been appointed general manager; Mr. A. E. Smith, mine manager; and Mr. John Brown, Overman. These mines, under the Inland Coal and Coke Co., have produced as high as 15,000 tons a month. The new company is taking hold vigorously, as is shown by the fact that last month, although the work may be said to have just started, 4,000 tons was produced.

Mr. A. R. Webster, formerly of the Northern Ontario Light & Power Company, has been appointed an Inspector of Mines for the Ontario Government. Mr. Webster will devote his time principally to inspection of electrical equipment at the mines throughout the whole province. His headquarters will be in Toronto.

Lieut. H. Smeddle of the 15th battalion tank corps has been promoted to Captain.

Dr. W. G. Miller, Provincial Geologist of Ontario, who is to represent Canada on the advisory board of the Imperial Mineral Resources Bureau sailed for England on May 17.

Mr. E. R. Bush of New York was in Toronto last week on his way north.

The Ontario Bureau of Mines will geologically map an area of several townships near Lake Abitibi this summer. C. W. Knight, A. G. Burrows and P. E. Hopkins of the staff of the Bureau and A. L. Parsons of the University of Toronto, mineralogy department, will all work in this area.

At the Annual Convention of National Association of Manufacturers, New York, May 20-22, H. E. T. Haultain will speak on "Restoring disabled soldiers and sailors to industry." Prof. Haultain is vocational officer for Ontario.

The Dominion Forgings & Steel Co., Hamilton, Ont., has received a contract from the United States Government for shells amounting to \$2,500,000. It is expected that other large orders will be placed in Canada in the near future.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Vancouver Island Coal Mining Industry is Active.

The coal industry of Vancouver Island, British Columbia, was never in a more flourishing condition than at the present time. From the East to the West of Canada has gone forth the order "more and yet more coal" and the companies of this section are speeding up to an extent only limited by their ability to obtain equipment and men. The Canadian Government has intimated that the Western Provinces this year would be expected to produce two and one half million tons more coal than in 1917, the object being to meet the local demands for fuel for industrial and domestic purposes as far as possible, if not entirely, from local supplies. Thus, it is hoped, Canada's present dependence on the United States, a condition which was very apparent last year at a time when the United States could least spare the coal, will be to some extent relieved.

With the situation as thus sketched before them the coal mine operators of Vancouver Island, no doubt in common with those of all the Western Section of the Dominion, look upon themselves as in duty bound, from the viewpoint of the best interests of the British Empire and her Allies, apart from the question of whether it is or is not good business, to do their utmost to swell the monthly output. Last year there was an exceptional demand and the Island collieries, rising to the occasion, marketed 1,698,235 tons in comparison with a total for 1916 of 1,492,761. But then there was not the special application of the spur that recently has been brought to bear upon them, with the result that the first three months of 1918 finds practically every mine with returns considerably in excess of the corresponding periods of the previous year. It may be said now with assurance that, at the pace set, 1918 will find the Vancouver Island output of coal much ahead of the past twelve months, while the same may be said with confidence, although the writer has not the figures before him to substantiate it, with regard to the combined totals of the collieries of the Province of British Columbia.

Western Fuel Co. is Making Record Output.

The Western Fuel Company, one of the largest producing companies of the Island, established a record for the month of March of 70,000 tons, which is larger than that of any previous month in its fifty-year history of operation. One of its recent enterprises was the re-opening of an abandoned mine known as the Harewood. It had been standing for several years, a former management having decided that it could not be expected to pay expenses. In March the Harewood's output ran up to the useful total of 19,000 tons. This, however, is not all. The company has possession of a considerable area of coal lands in what is known as the Nanaimo Coal Field which is yet undeveloped. Coal being a national necessity under existing conditions, it has been decided to open up some of these areas and diamond drilling now is in progress with that end in view. The definite intention is to open two new mines and these, it is believed, will be producing coal before the end of 1918.

Canadian Collieries Ltd., is Extending Operations.

The Canadian Collieries (Dunsmuir) Ltd., is another company which is nicely engaged in the extension of its operations. It is opening a new mine on the Douglas seam at South Wellington, a well-known coal mining centre of the Island. Three parallel slopes are being

driven to tap this area. A good substantial tippie is being built and a modern screening and cleaning plant is being installed. A large power house has been erected which contains three return tubular boilers of good steaming capacity. Compressors and dynamos for furnishing power for the mine have been installed. There are being laid out extensive sidings and yard room which will be connected with the Esquimalt & Nanaimo Railway by a short spur. This will enable the coal to be shipped over the E. & N. to the company's wharves at Ladysmith, B.C., where it may be distributed overseas to the local or foreign markets. Before the end of the year this mine should be one of the Island's large producers.

The New Granby Coal Mine and Coking Plant.

About three miles south of the above mine, between Ladysmith and Nanaimo, B.C., is the centre of another new and important development of the coal mining industry of Vancouver Island. Here the Granby Consolidated Mining, Smelting and Power Co., Ltd., has secured, at an outlay of approximately \$750,000, a considerable block of coal lands. The opening of a new mine, the installation of the necessary plant for the handling of the coal, the erection of buildings for the accommodation of employees, and the construction of wharves, etc., at a seaboard point known as Cassidy's Landing will involve a further expenditure of at least \$500,000. This work is in progress, in fact has made considerable headway. The company's plans, however, do not stop at this, it being proposed to install at Anyox, B.C., the company's mining and smelting centre on the coast of the mainland of British Columbia, a by-product coke-making plant at a estimated cost of \$1,500,000. This will make it possible for the company to mine its own coal, transport it to Anyox for treatment, and thus secure the coke needed for the smelting of its large copper deposits.

In the opening of its new coal mine the company is driving three slopes; one of which is to be used as a main haulage way, another for ventilation, and the third for a mainway. A large acreage has been cleared, graded and surveyed into lots for building houses while a spur has been constructed from the E. & N. Railway into the mine site, while sidings and yards are being laid out and a sawmill is being installed to cut timber for the company's use.

It may be said, with respect to this enterprise, one of the most notable in connection with the coal industry in Western Canada for years, that it has been brought about largely because of the determination of the company to be as independent and as self sustaining in its operations as possible. It is easily the greatest producer of copper in British Columbia, the total production for the Province in 1917 being, roughly, 59,000,000 lbs., to which the Granby Company's contribution was, also in rough figures, 34,500,000 lbs. In 1916, however, its output was 45,631,600 lbs. The decrease is accounted for by the fact that last year, owing to the explosion at the Fernie Coal Mines, Coal Creek, and the ensuing strike, there was a period during which the usual source of coke was unavailable. With these facts in mind the chief object which the management of the company has in mind in its present programme is apparent.

Incidentally at present, but a factor which may enter very largely into the Granby Company's activities in the future, are the possibilities of the by-product ovens and the recovery of those elements of the coal the importance of which have been so strongly emphasized as a result of the disorganization of the old

commercial order by the war. Into this branch of industry the company proposes entering very thoroughly and it is confidently believed that the outcome will be the development in Western Canada of a number of profitable subsidiary industries.

The Granby's Company's coal mine, at the present rate of development, should be prominently on the list of producers before the end of the year.

Supplementing my recent account of the marked activity of the Vancouver Island Collieries, of Vancouver Island, B.C., it is gratifying to be able to report that much the same condition prevails in other coal mining districts of the Province.

In the Nicola-Princeton District the output up to the end of February, in comparison with the same period last year, showed an improvement of 20,000 tons. Two collieries have been opened up again which had been closed for a considerable period. The Island Coal and Coke Company has been re-organized under the name of the Fleming Coal Co., and its mines, at Merritt, B.C., have resumed operations after a suspension which dates back to the middle of the month of March, 1917. The Coalmont Colliery has been reopened after a period of idleness extending from the early part of 1915. The Middlesboro Collieries are the largest producers in this district, being engaged in the operation of three mines. The Princeton Collieries rank second in production, but will have a keen rival for second place during the coming months in The Fleming Coal Co.

Since the taking over of control by the Dominion Government of the collieries of what is known as District 18 by the United Mine Workers of America, the mines of the Crow's Nest Field, B.C., which come within that section, have been making a very good showing. The production thus far this year is considerably greater than that for the first two months of 1917, the tonnage produced by these mines for January and February, 1917, being 94,295 tons, while for the same period this year it reached 135,986 tons, an increase of 41,691 tons. It is reported that satisfactory progress had been made in cleaning up the mines, which were wrecked by "bumps" and explosion last April, and these mines soon will be active producers again.

Amendments to B. C. Mining Acts.

Three amending Acts, directly in the interests of men working in and around mines or smelters, were passed at the recent session of the British Columbia Legislature. These are entitled, "An Act to Amend the Labor Regulation Act," "An Act to Amend the Metalliferous Mines Inspection Act," and "An Act to Amend the Coal Mines Regulation Act." The former provides for an eight hour working day for all men employed "in, or about any coke-oven, smelter, concentrator, or mineral separation plant." The chief amendment to the Metalliferous Mines Inspection Act is that providing for an eight-hour working day to those employed underground, whose working day will start when they leave the surface and end when they reach it again, as well as those employed on the surface. These two Acts will become effective on the 31st of March, 1919. The amendment to the Coal Mines Regulation Act gives the surface workers at coal mines the eight-hour working day from the 31st of March of next year. New legislation also stipulates that inspectors of metal mines, after making their inspection, shall post the result thereof in some prominent place outside the workings in order that the miners may be kept in touch with the conditions under which they

are working. Another provision is that "every drill used in stoping in any mine where the character of the ground is such that dust is caused" by the work shall be equipped with a water spray.

ONTARIO.

Assessment Work.

Definite assurance has been given by the Ontario mines department that prospectors will not be compelled to perform two periods of assessment work on their claims in one year. Where two periods of work accrue due in one year, the second period will be extended one year. It should be thoroughly understood, however, that there will be no general extension similar to that of last year. An Order-in-Council will be passed in the near future making it compulsory for all claim holders to do one period of assessment work this year. This will insure activity in the prospective mining field without the imposition of an unusual burden.

Adanac.

Further shearing has been encountered in the north crosscut at the 130-ft. level of the Adanac, and the face of the crosscut has reached a point where it is daily expected the downward continuation of the large vein encountered on the surface is expected to be picked up. The shearing just encountered is about three inches in thickness and assays show low silver values. The presence of silver and cobalt stain in the shearing just encountered is taken as good indication.

Peterson Lake.

The twelfth annual report of the Peterson Lake Silver Cobalt Mining Company, Limited, covering the year ended April 30th, shows an expenditure of \$36,124, as compared with an income of \$1,330, thereby showing an operating loss of \$34,794. Cash on hand amounts to \$11,658. During the current year it is expected the assets of the company will be largely added to by the treatment of the dumps and slimes which have gathered on the property from previous operations. It is expected to have the oil flotation mill, which is now nearing completion, in operation in June on the treatment of the slimes in the Seneca-Superior section of the property. The company also claims ownership of a large quantity of slimes now in dispute with the Dominion Reduction Company. The Dominion Reduction is understood to have appealed from the ruling of the court. The slimes in dispute are those deposited up to July 2nd, 1915, and according to government returns the amount is estimated at about 226,640 tons. The company estimate the silver content at 6½ ounces per ton.

Temiskaming—Hohenour.

Litigation is likely to follow any attempt on the part of the Temiskaming Mining Company to remove the mining plant from the Hohenour claims in the Kirkland Lake district, on which they have been carrying on development work, under an option agreement for the property. Recently an extension of time was granted on the option, at which time the owners of the claims contend the original agreement respecting the removal of the plant underwent a change to the effect that the plant should be left on the property. The original agreement permitted of the removal of this equipment, which was formerly used by the Temiskaming Mining company in the development of the North Thompson property at Poreupine.

Croesus.

According to recent rumors the rich Croesus mine in Munro township is soon to figure in the organization of a stock company, for the further operation of the property. Last year a 50-ton mill was installed on the Croesus, and it was intimated on every hand that a large tonnage of \$50 and \$60 ore was available for treatment. The property is privately owned and the suspension of operations a few months ago was a considerable surprise to mining men throughout the north country. The Croesus during the early days of its development yielded some of the richest gold ore ever found in the world, and in sinking the first 100 ft. of shaft something like \$100,000 in gold was taken out. While no official statement has been given out, it is understood the rich ore does not continue consistently to depth. The rich vein is also said to have faulted and its continuation has so far not been re-located. These facts tend to strengthen the report that a joint stock company is being formed.

Patricia Mill Nearly Complete.

It is expected the new 50 ton mill of the Patricia Syndicate at Boston Creek will be in operation by the first of June. The record of this property during the past seven months has been a wonderful one. The first ground was broken on the Patricia late last fall. In the meantime a mining plant has been installed, a large set of camp buildings erected, and the underground workings carried to a depth of 200 ft. While the vein is not wide compared with those of Porcupine and Kirkland Lake, the grade of the ore is such as to permit of selective mining, from which it is expected a substantial profit will be derived. Mr. Charles O'Connell, formerly manager of the Tough-Oakes Mine at Kirkland Lake, is in charge of the property. The results of the first mill run will be awaited with a good deal of interest by those holding claims in the Boston Creek district.

Rich Ore at Burnside Mine.

Some of the richest ore ever encountered in the North Country is in evidence at the Burnside property at the point where the vein was encountered in the crosscut at a depth of 125 feet. A pay streak carrying visible gold about seven inches in width occurs in a five foot vein, the whole of which is of a commercial grade. The dip of the vein at the present point is to the north, but like those on its neighbor, the Tough-Oakes, it is expected to change to the south when depth is reached. It has been reported recently that there is a move on foot for the amalgamation of the Burnside and the Sylvanite properties. The Burnside is controlled by the Aladdin-Cobalt Mining Company, and is at present using the electric plant of the Sylvanite company in its development operations.

Kerr Lake.

During the month of April production at the Kerr Lake Mine was maintained at two hundred and one thousand ounces. This compares with 207,000 produced during the month of March. Only once during the past sixteen months has the production of the mine fallen below 200,000 when in July of last year 189,392 ounces were produced. This is at the rate of about 7,000 ounces every twenty-four hours. This output at the present price of silver works out at a profit of about \$150,000 monthly or approximately \$1,800,000 per annum.

Ontario-Kirkland.

The Ontario-Kirkland Mining company plans to resume operations about the middle of June. The development work previously done on the property has shown up several veins which are large and contain very encouraging gold assays. The company controls what were formerly known as the Hurd claims. A shaft has been driven to a depth of about 100 feet and considerable prospecting work has been done.

Installing Plant at Molybdenite Property.

About forty tons of equipment has been shipped to the Indian Peninsula Mining company property near Amos on the Transcontinental railway. The company propose installing a 100-ton oil flotation mill for the treatment of molybdenite ore and it is expected that within the next few weeks a portion of the equipment will be in operation. Tests, made in the laboratory of the Groch Centrifugal Flotation Limited at Cobalt, have demonstrated that a high recovery can be made, by the oil process in the treatment of molybdenite ore.

According to recent reports it is understood the Three Nations Mining Company's property in the Township of Whitney, Porcupine District, may be re-opened at an early date. It was at one time rumored that this property and the old La Palme, both of which were considered to be excellent prospects in the early days of the camp, would be amalgamated. However, until the present time both properties have remained separate.

Shipping Ore From Keeley Mine.

Shipments of ore are being made regularly from the Keeley Mine in the South Lorraine section of the Cobalt district. It is estimated that there are perhaps a quarter of a million ounces of ore in sight. A limited amount of this ore is high grade and is being shipped by the wagon road to Silver Centre, from which point it is taken to the railway at Haileybury, from where it is shipped to the smelter for treatment. The balance of the ore is low grade and is not available at the present time owing to the fact that underground work has not yet been started. It is expected, however, that the pumping out of the mine will be commenced in the immediate future. The property has been connected up with the Matabiechewan power line of the Northern Ontario Light and Power Co.

New Plant at McKinley.

The new flotation equipment at the McKinley-Darragh was tried out last week and is being gradually brought up to capacity. Within a short time it is expected the plant will be brought up to a capacity of 200-tons per day. According to recent reports the costs at the McKinley-Darragh are being kept considerably below that of last year. This is partly due to the erection of the new oil flotation plant. A big item in last year's expense account was the connecting up of the main shaft with the lower workings of the mine.

Treating West Dome Ore at Dome Lake Mill.

The treating of ore from the West Dome property has commenced in the Dome Lake mill. According to the present arrangement a test run of 1,000 tons will be put through. Whether the company intends to continue the use of the Dome Lake Mill or not, has not been made known. It is understood the capacity of the

Dome Lake mill is more than sufficient for that company's ore, and such a scheme would appear to be feasible.

Doherty Prospectors Want Recording Office Changed.

Prospectors and mining men interested in the Doherty district at Doherty Siding on the T. & N. O. south of Temagami, are petitioning the Mines Department for the location of a more convenient place of recording than at present. Under the arrangement now ruling recording and other official business is transacted in Toronto. It is thought this could be more conveniently done at Haileybury.

Temiskaming.

Operations in the mill at the Temiskaming Mine have been suspended for the time being. However, underground development work will be continued more aggressively than ever. The amount of ore at present available was not sufficient to keep the mill running to capacity and the hoisting of ore was interfering to a certain extent with the efficiency of underground work, thus the management believe that with the extra speeding up of underground work sufficient ore will soon be developed to keep the mill running at capacity. In the meantime, advantage will be taken of the shutdown in this department to make much needed repairs to the plant.

Encouraging results are being met with in underground work at a number of points and it is possible much new ore will be developed. The main underground work is being prosecuted at the 700 ft. and 1,600 ft. level and results are said to be very encouraging.

Tough-Oakes.

Work at the Tough-Oakes Mines is understood to be resulting favorably. Interests closely identified with the directorate of the company have intimated that a substantial profit is now being made. In addition to wiping out the deficit of last year, it is expected a substantial profit will be shown on this year's operations.

Tech-Hughes.

During the month of April the tonnage treated at the Tech-Hughes mill at Kirkland Lake was in the neighborhood of 1,969 tons. The gross gold content for the month averaged about \$5.86 per ton, which is lower than usual. It is the policy of the Tech-Hughes management to draw all the mill rock from development work. Later on when selective mining is undertaken it is expected a substantial profit will be shown over operating costs.

Nipissing.

For the month of April the Nipissing Mining Company's production was at the rate of not far under \$11,000 per day. The company mined ore of an estimated value of \$329,617 and shipped bullion and residue of an estimated net value of \$308,736. Several small veins of promise were encountered in shaft 73. The high grade mill treated 210 tons and shipped 296,453 fine ounces of silver. The low grade mill treated 7,623 tons. This is the highest month's production of Nipissing during the current year and was only exceeded once during the year 1917, when in September last 349,258 ounces of silver were produced.

Your Mine Production Must Be Continuous

Maximum, top-notch coal production, continuously assured and nothing less, is the program that will help Canada and our allies achieve victory. Don't take chances with costly, time-delaying machinery breakdowns. Play safe by providing your repair shop with

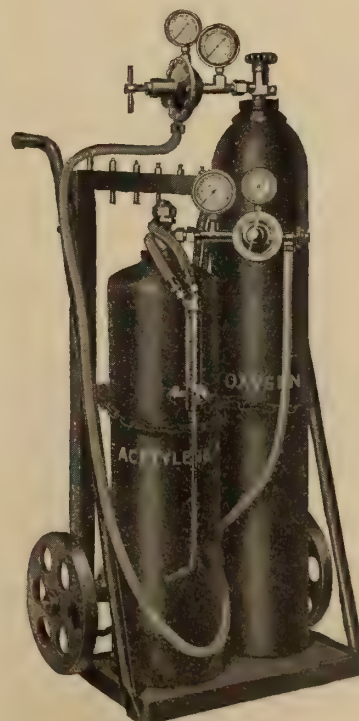
IMPERIAL WELDING EQUIPMENT
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Dome Extension11¼	.11½
Dome Lake20
Dome Mines	8.00	..
Hollinger	4.87	4.95
Imperial01	.01¼
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Bailey03½	..
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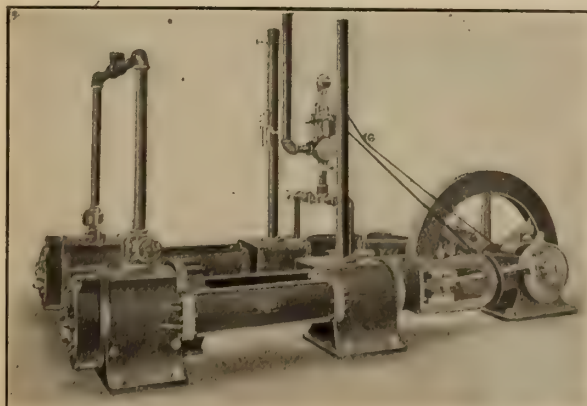
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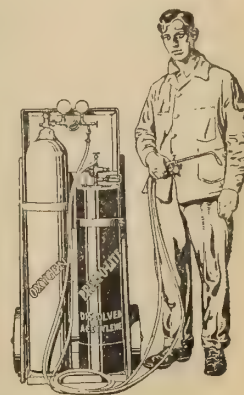
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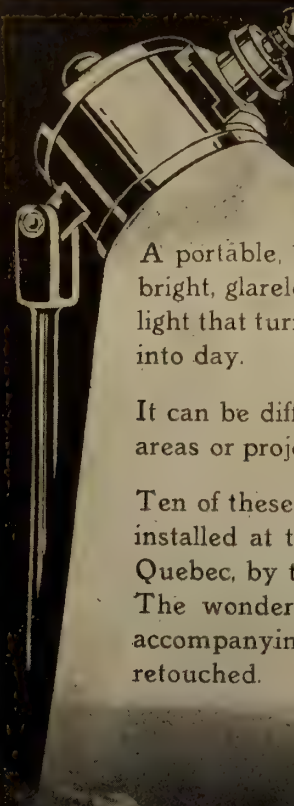
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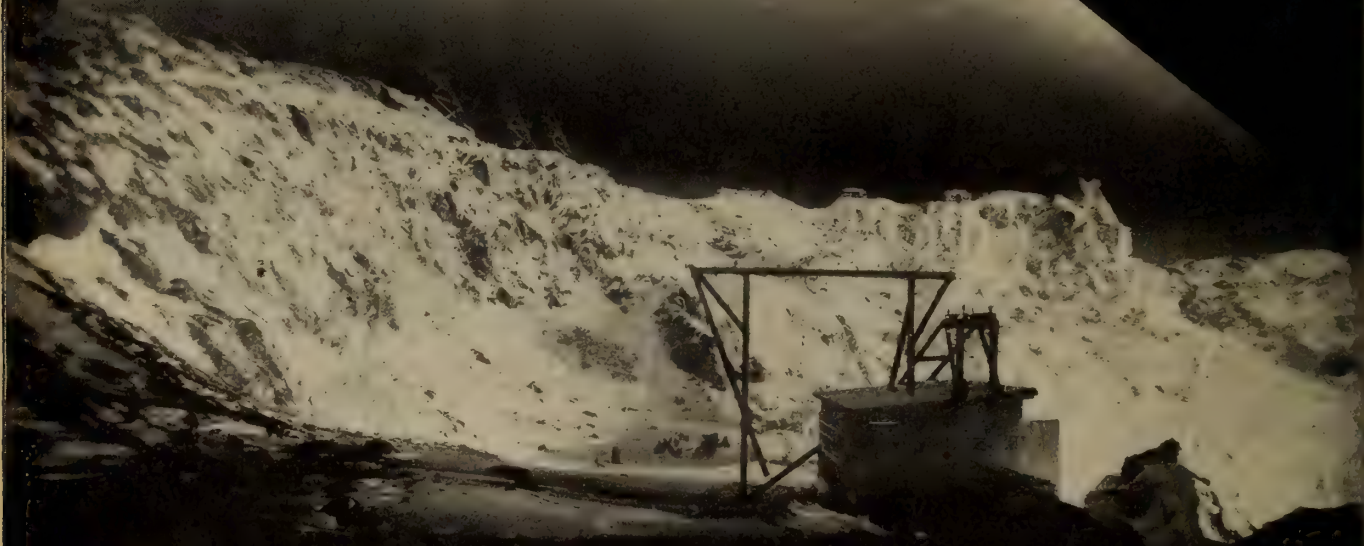
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- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

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- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

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- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
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- Assayers and Chemists Sup-
plies—**
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Lyman, Ltd., Montreal, Que.
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Company.
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Canada Metal Co., Ltd.
Can. B. K. Morton.
Hoyt Metal Co.
- Balances—Heusser—**
Mine & Smelter Supply Co.
- Ball Mills—**
Hull Iron & Steel Foundries,
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Mine & Smelter Supply Co.
- Belt—Leather, Rubber and
Cotton—**
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Jones & Glasco.
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- Blasting Batteries and Sup-
plies—**
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- Blowers—**
Northern Canada Supply Co.
- Boilers—**
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- Buckets—**
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M. Beatty & Sons, Ltd.
Marsh Engineering Works.
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ground—**
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- Cableways—**
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- Cages—**
Northern Canada Supply Co.
- Cables—Wire—**
Standard Underground Cable
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Armstrong, Whitworth of
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pressed Air and Storage
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Canada Metal Co., Ltd.
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June 15, 1918

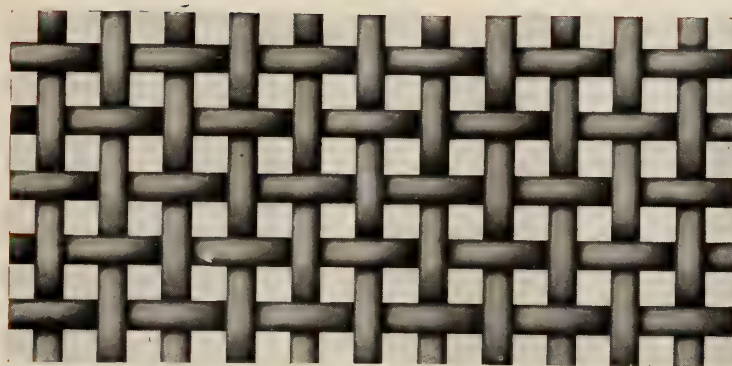
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TORONTO

No. 12



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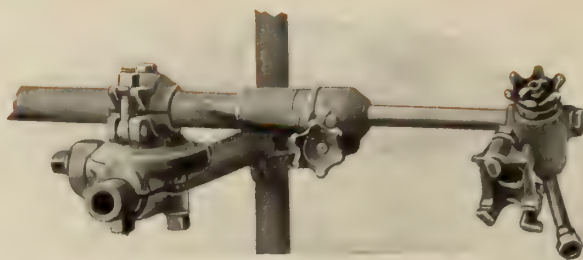
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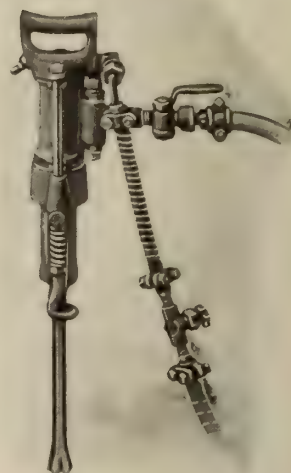
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Detail view of "D-62" Pneumatic Feed Mounting, showing method of attaching "DP-33" Drill, and Air Inlet Swivel.





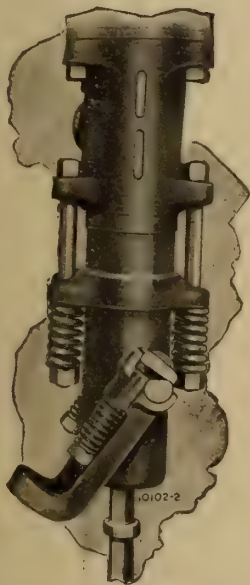
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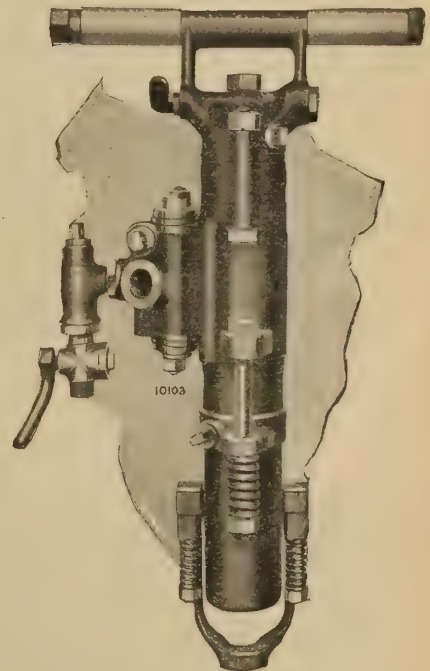
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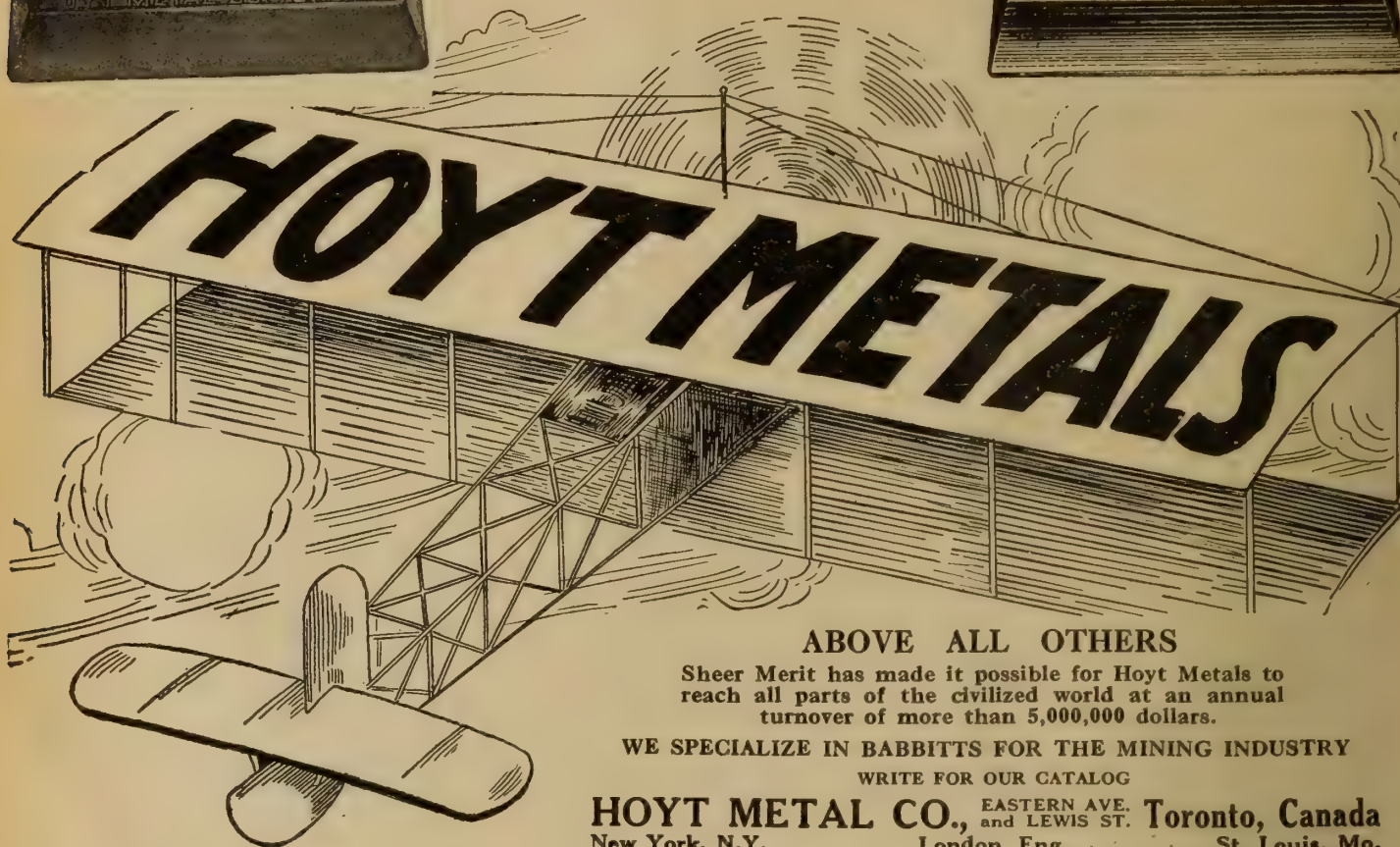
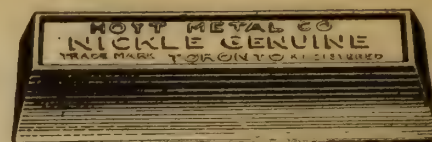
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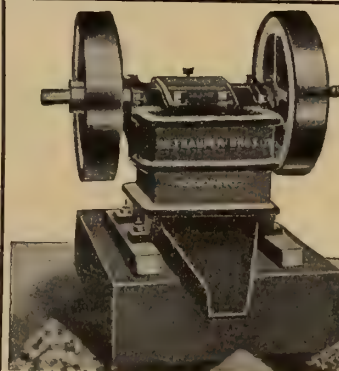
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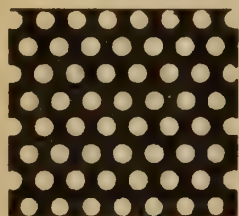
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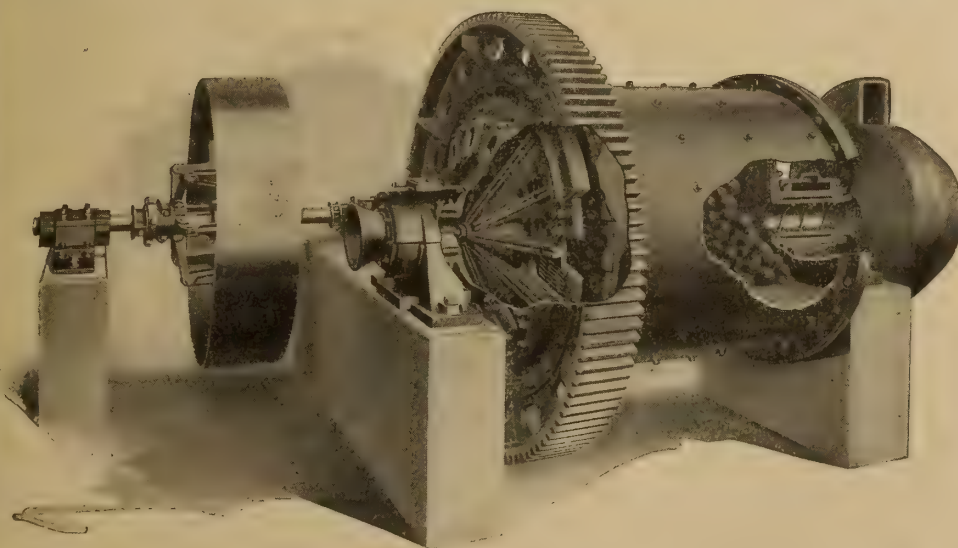
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Department of Colonization, Mines and Fisheries

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WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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The Flotation Process

All patent and other rights to this process
in North America are now controlled by

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who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167 603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

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Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

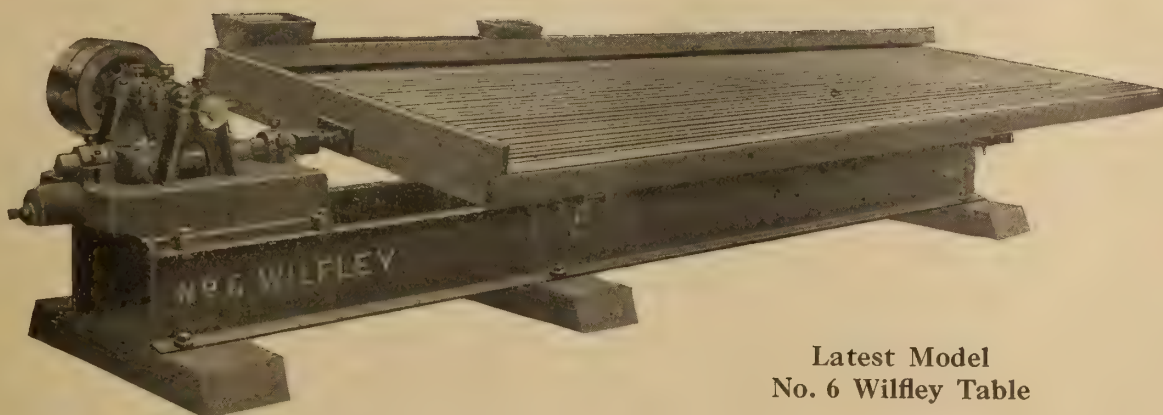
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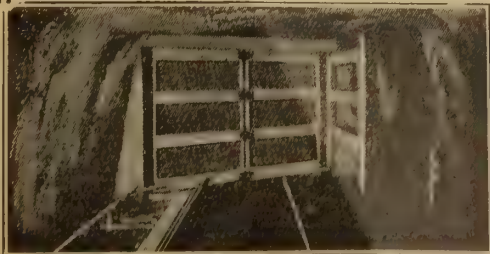
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, June 15th, 1918.

No. 12

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the
MINES PUBLISHING CO., LIMITED

Head Office 263-5 Adelaide Street, West, Toronto
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Editor: **REGINALD E. HORE, B.A. (Toronto).**

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CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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We publish in this issue a few extracts from the report of Mr. A. G. Burrows, of the staff of the Ontario Bureau of Mines, on the Metachewan gold area. At least one property in this area is to receive careful examination this summer, the Colorado-Ontario Development Company having undertaken development of the Otisse claims in Powell township. The report and map just published by the Bureau of Mines should prove very useful to those who work in the area. Mr. Burrows is an acknowledged authority on the geology of Northern Ontario gold areas.

The Munitions Resources Commission is undoubtedly doing some useful work. It may yet live down that

MINING IN EASTERN ONTARIO.

Ontario is a producer of many minerals. The Sudbury nickel-copper mines, Cobalt silver mines and Porcupine gold mines include some of the world's most notable metal mines. In this number we draw attention to a part of the Province that receives less notice from mining men, but which includes many important mineral deposits.

The most recently developed industry is that of fluorspar mining at Madoc, in Hastings County. The growing consumption in the United States some time ago created a scarcity of fluorspar in Canada. In the expectation that supplies from the United States would perhaps be entirely cut off, it was thought very advisable to develop domestic deposits. The price rose so rapidly that there was reason to expect that some of the Madoc properties might be profitably developed. Exploration during 1917 met with satisfactory results and some good deposits are being opened up.

Madoc is the centre of a prosperous farming community. It has for some time been noted also as a tale producing centre. The Henderson mine at Madoc has been a steady producer for years. The deposit is an exceptionally good one.

Eastern Ontario is to-day an important producer of tale, graphite, feldspar, pyrite, mica, lead, fluorspar, and molybdenite. The Black Donald graphite mine near Calabogie, in Renfrew County, is a large producer. The feldspar mine near Verona in Frontenac County, operated by Feldspars, Ltd., is reputed the best in America. The Lacey mine, near Sydenham, is said to be the largest mica mine on the continent. Excellent pyrite is produced near Quensboro and at Sulphide, in Hastings County.

While overshadowed by that of Northern Ontario, the mineral production of Eastern Ontario is considerable. Many of the minerals are very necessary in the manufacture of munitions and it may be expected that activity during 1918 will be marked. Shortage of labor will, of course, prevent the obtaining of desired production, but a good record will doubtless be made.

The question of smelter rates for lead-silver-zinc ores has been much discussed in British Columbia recently. In response to requests from many sources, the government has appointed a committee to investigate the matter. It is to be hoped that elucidation of the facts will result in more satisfactory relations between mine owners and smelter interests.

The bounty of two cents a pound on zinc produced in Canada should materially help the development of the electrolytic process now used in British Columbia. Zinc of very high quality is being produced; but competition with American smelters is impossible under present

ONTARIO'S NEW OIL FIELD.

During the past year there has been a notable revival of interest in oil and gas production in Ontario. The results of recent drilling in Dover township should give a great impetus to oil prospecting. It is probable that there will be more activity in Ontario oilfields this summer than has been evident for many years.

Canada's chief oil producing district is part of south-western Ontario, between Lake Huron and Lake Erie. For over half a century Lambton county has been a steady producer. The Tilbury district in Kent county, and the Onondaga district in Brant county have been prominent in recent years. Most of the oil has been obtained from the Onondaga formation, but the recent discovery in Dover township is in the Trenton limestone.

Not only is the new well a good producer; but it is an indication of what may be expected when the Trenton formation in Ontario is explored. In the Ohio-Indiana field, extending from north-western Ohio down in a south-westerly direction into Indiana, most of the oil comes from the upper part of the Trenton limestone. This horizon is geologically considerably below the horizon which has been Ontario's chief source of oil up to the present. To develop the Trenton deposits extensively it will be necessary to drill many deep wells.

Mr. Eugene Coste, one of Canada's most experienced and successful oil and gas authorities, after recently visiting the Dover fields, said in an interview to "The Globe": "We would deprecate the creation of any excitement regarding the Dover fields; but the indications are that they are permanent."

Leading economists have told us, what every producer of gold knows, that the production of gold during the war is not so profitable as the production of metals used in the manufacture of munitions. But can we afford to neglect production of the metal which the world has accepted as the standard of value? So long as the world recognizes gold as the standard, it will be desirable that the allied countries should have as large a percentage of it as possible. It would be foolish to divert energy from the production of materials necessary to carry on the war, in order to produce gold which a victorious enemy would be able to take from us; but on the other hand it seems unwise to discourage production of the metal which can be used so advantageously both during and after the war.

Canada is a country of great natural resources; but it is well to remember that these resources become valuable only when utilized. Every day that gold lies in the ground the country is losing money. It may be true that the mine-owner might profit as much or even more by delaying development until after the war, when supplies and labor may be cheaper; but that only means that the workman gets less for his labor and the manufacturer gets less for his goods, and we have denied ourselves the use of the gold. Is it not in the

best interests of the country to get our gold into circulation, as soon as possible?

DOMINION POWER BOARD.

The question of an adequate supply of fuel and power for all of Canada is one which has been brought sharply into view as a result of the acute fuel shortages during the past two winters. Certain phases of the situation demand and are receiving immediate action through the Fuel and Power Controllers and the Honorary Advisory Council for Scientific and Industrial research. The general problem of the fuel-power requirements of Canada is one that the end of the war will not solve. It is not merely a question of looking ahead for a year or two years or for whatever time the present conflict may last, but rather a matter of providing for all time to come.

Canada is recognized as one of the greatest water power and coal countries in the world. No people enjoy to a greater degree the benefit of cheap dependable hydro-electric power and none have had this benefit more universally adapted for municipal, industrial and domestic use. Canada's resources of coal are of tremendous extent, but are so located and of such a nature that special problems must be solved before they are made available to their maximum possible extent for domestic and manufacturing purposes. The future progress of the country depends very largely on the development and use of all the available fuel-power resources. To realize this, the Government has formed a Dominion Power Board comprising nine permanent officials of the various Departments who have become as a result of their regular departmental work, recognized authorities on various aspects of the fuel-power problems of the country. This Board has also been charged with the responsibility of co-ordinating all the investigation activities of the Government with regard to fuel power resources.

The Board has two main functions, (1) the collection of information, (i.e., Intelligence Service); and (2) to advise upon the development and use of fuel power resources of the country (i.e., an advisory body).

The Honorable Arthur Meighen, Minister of the Interior, is Chairman of the Board. The members are: Arthur St. Laurent, Assistant Deputy Minister, Department of Public Works. C. N. Monsarrat, Consulting Engineer of the Department of Railways and Canals. W. J. Stewart, Consulting Engineer to the Department of External Affairs regarding International waters. John Murphy, Electrical Engineer to the Dominion Railway Commission. H. G. Acres, Chief Hydraulic Engineer, Hydro-Electric Power Commission of Ontario. O. Higman, Chief Electrical Engineer, Department of Inland Revenue. D. B. Dowling, Geologist, Department of Mines. B. F. Haanel, Chief Engineer, Fuel Testing Division, Department of Mines. J. B. Challies, Chief Engineer and Superintendent, Dominion Water Power Branch, Department of the Interior.

The Bennett-Martin Asbestos and Chrome Mines Company has begun construction of a mill. The mine in Ireland township was opened a year ago and good results have been obtained on development.

At the Jacobs asbestos mine, the milling method of mining is to be used. Underground haulage will be by electric locomotives. The old method of mining, still used, is open pit. Instead of cable derricks for hoisting, a shaft will be used in the new workings.

The Matachewan Gold Area*

By A. G. Burrows.

In the fall of 1916 a discovery of gold was made on the Davidson claims in Powell township, which is on the Montreal river, in the District of Timiskaming. Powell township is near Fort Matachewan, a Hudson's Bay Company post, consequently the area has become known as the "Matachewan Gold Area." Prospecting had been carried on from time to time since the discovery, in 1906, of silver in James township, at Elk Lake. Gold was found at several places in the southeast part of Alma township and in the north central part of Cairo township, in an area of syenite, a few years previous to the discovery in Powell.

At the Davidson claims in Powell township the original discovery was native gold in an irregular mass of quartz and rusty weathered schist. In 1917 gold was found in a reddish porphyry by Sam Otisse on his own claims to the northeast of the Davidson. This prospector also discovered gold in a band of grey pyritous schist which lies to the south of the porphyry. Further work on the Davidson claims resulted in gold being found in the red porphyry which outcrops on these claims.

Since there was no detailed geological map of this area, the writer was instructed by Dr. W. G. Miller, Provincial Geologist, to make an examination of the country in the vicinity of the "finds." It was found that while a number of claims had been staked the previous winter, work was being done on only a few of these, consequently only a very small part of the new staking has been well prospected.

A geological knowledge of the area was obtained by travelling the township boundaries, traversing most of the water routes, and making sections away from the water routes. Only a few of the claim lines in the vicinity of the Davidson find were travelled, since most of the claims were very irregularly staked in the winter and difficult to follow in the thick bush in summer. However, a general examination was made of Powell, Cairo, Baden and Alma and the Matachewan Indian Reserve, while portions of the north parts of Yarrow and Kimberley also received attention.

During the season of 1917, Dr. H. C. Cooke, of the Dominion Geological Survey, examined an extensive area to the west of the Matachewan area, and his map of this country, showing the geology and canoe routes, will be of great assistance to the prospectors working westerly from the Montreal river.

The nearest railway station is Elk Lake, the terminus of a branch line of the Timiskaming and Northern Ontario railway that leaves the main line at Earleton station.

From Elk Lake there is a canoe route up the Montreal river a distance of about 30 miles to the Davidson landing. In high water in spring a gasoline boat has been utilized as far as the foot of the Long portage, with a short portage around Indian Chute. The trip by canoe alone is very arduous owing to the swift current in the Montreal river above Indian Chute. In this trip three portages are necessary. In low water during the summer all the stiff rapids above Indian Chute are usually poled or tracked. A route from Elk Lake, by way of Long Point lake, was used by various parties in 1917. This requires transportation of supplies and canoes over the Gowganda wagon road to Long Point lake, from which there is a water route down stream

by way of the East Branch of the Montreal river to the Matachewan area. Supplies for operations in 1918 were taken in (from Elk Lake railway station) over a winter road that roughly follows the Montreal river.

Rocks of the Area.

The oldest rocks of the area are of Keewatin age and consist mostly of basic to intermediate volcanics, accompanied by chert (iron formation) and schistose sedimentary rocks like quartzite and conglomerate. These have been intruded by numerous diabase and porphyritic dikes, whose age, beyond that they are younger than the Keewatin schists, is difficult to determine.

The older rocks have also been intruded by acid rocks like granite, syenite, gneiss and porphyry, which are probably of Laurentian or Algonian age. These acid rocks have also been intruded by numerous dikes of diabase, some quite fresh-looking.

A series of flat-lying sediments of the Cobalt series has been deposited on the eroded surface of the older greenstones, granites, syenite, porphyry, and some of the diabase dikes.

At only one place was a diabase dike observed intruding the Cobalt series, but a few others have been reported. This is in marked contrast to the older rocks, which are everywhere intruded by numerous dikes of diabase, consequently most of these dikes would appear to be older than the Cobalt series. In addition, at several points unconformities between the Cobalt series of sediments and diabase dikes have been noted. It would therefore seem that the conglomerate in the area would not be worth prospecting for silver, owing to the scarcity of sills and dikes of diabase of Keweenaw age.

The chief interest in the area is in its possibilities as a gold producer. For some years gold has been known to occur in Cairo and Alma townships, but it was not until the discovery on the Davidson claim in Powell in 1916 that the area attracted much attention.

Since only a small part of the area has been closely examined by the prospectors, it is possible that other promising finds will be made in the Keewatin areas in Powell and adjoining townships. The Keewatin rocks near the contact with the intrusive syenite in Cairo and Alma townships should be worthy of close examination and it is possible that other small masses of orthoclase porphyry, similar to the occurrences on the Davidson and Otisse, will be found. Prospecting is, however, rendered difficult by deposits of sand and gravel over much of the area.

Gold in Cairo and Alma Townships.

Gold was found by Jake Davidson, a prospector, in the sand-gravel stretches to the north of the Montreal river, near Fox rapids; the writer is informed by him that he frequently obtained colors in the pan, but found no place where there was any placer workable under present conditions.

Gold occurs in quartz veins in some parts of Cairo and Alma townships.

Craig Claims.—The Craig claims are situated about three miles north of Fox rapids. Here a wide quartz vein was discovered with a north and south strike. At one place trenching has shown a width of 150 feet of quartz, and silicified and brecciated syenite which is the wall rock of the vein. Part of the vein material is somewhat felsitic in appearance, suggesting some fine-grained igneous rock related to the syenite.

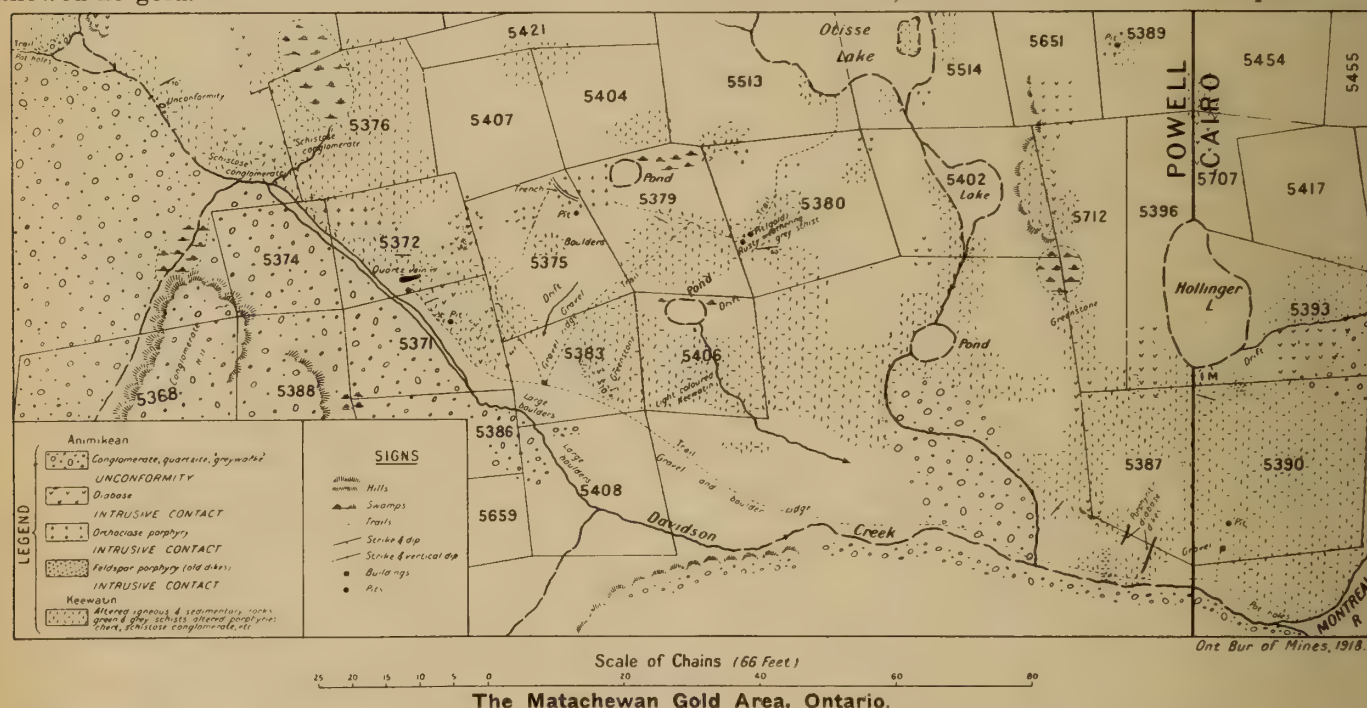
At one point a shaft has been sunk about 60 feet, with short drifts on the vein, and fine visible gold has been reported in the shaft and drifts, and in samples on the dump. No gold, however, was seen by the writer, but samples of material from the dump showed low values in gold. A little iron pyrites was observed in pieces of quartz and syenite, but generally the sulphide is in very minor quantity. The property is equipped with a small steam hoisting plant and has a good set of mine buildings.

Chief Claim.—The Chief claim (17310) is situated about 20 chains west of the two-mile post on the east boundary of Alma. A discovery of gold in a small hummock of syenite, which outcrops in a beaver meadow, was made some years ago. The vein strikes E. and W. and is quite narrow, varying in width from a mere crack to about 6 inches where exposed for 30 feet. A few shallow pits were sunk on the vein, and some samples rich in gold are reported to have been taken from the westerly pit, which was filled with water at the time of the visit. A sample of vein material from the dump, consisting of quartz, chalcopyrite, and a little galena, gave an assay of \$4.40 in gold. Attempts were made by trenching to pick up the vein on the hill to the east, but only mere stringers were found, a sample of which showed no gold.

the summer of 1917, and there were only a few prospectors in Cairo and none in Alma.

Gold in Powell Township.

Davidson Claims.—These claims are situated in Powell township about two miles west of the Montreal river. Gold was found by Jake Davidson in 1916, on the south part of claim 5372, in a mass of quartz and schist. This deposit strikes nearly east and west, and has been traced by trenching for 225 feet. It dips 60° S., is 40 feet wide at the west end and narrows toward the east. The quartz is very irregularly distributed in the schist, and for the most part the veinlets or quartz masses are transverse to the strike. The deposit very probably is lenticular in form. To the southeast there are a number of huge boulders of material from this deposit. The surface of the schist is weathered to a brown rust, largely due to the oxidation of the iron in the ankerite which forms a part of the altered rock. There is also a proportion of bright green serpentinous mineral. Gold in a state of very fine division was noted at a few places in this deposit. The only sulphide observed is a little iron pyrites, but for the most part the deposit is deficient in mineralization. A few chains southeast there is a quartz vein on which a pit had been sunk some years previously by Steve Lafreica, of Fort Matachewan. This quartz vein



Brookbank Claim.—This claim (17801) lies in the southeast corner of Alma township where the rock is a red syenite. Some work has been done about four chains west of the east boundary of the township and just northeast of the cabin which is on the boundary. Here there is a N.-S. vein on which two pits had been sunk. The vein is about 2 inches in width between the pits, showing for 30 feet. The vein filling is chiefly quartz, but contains also some galena, copper pyrites, pyrite, and some barite and fluorite. No gold was observed, but one assay of 2 inches of vein contained \$5.20 in gold and 8 oz. in silver, while another of 5 inches in width from the north pit gave \$7.60 in gold and 8 oz. in silver.

Cooper Claim.—Gold is also reported on the Cooper claim (MR 5645), which lies nearly a mile northwest of the Brookbank.

The above properties were not being worked during

contains small quantities of cobalt bloom, iron and copper pyrites, which first attracted attention, but promising values in gold or silver were not obtained on assay.

The Keewatin rocks accompanying these veins are quite schistose, igneous and sedimentary. To the north of the first mentioned deposit there is a whitish altered porphyry which shows phenocrysts of orthoclase and plagioclase in a groundmass of feldspar and quartz, with much sericite and calcite. Near this altered porphyry there is ashy weathering chert, or iron formation. Part of the south wall of the deposit is schistose quartz-porphry with conspicuous phenocrysts of quartz.

Intruding the schist in the north parts of these claims there is a red orthoclase porphyry that has been referred to previously as gold-bearing. Iron pyrites occurs abundantly in portions of this rock, and there has been considerable oxidation, resulting in the break-

ing down to a red earthy material or loose fragments on the surface, that has involved a certain amount of surface concentration. This condition varies greatly in different parts of the property; on some of the knolls there are only a few inches or less of oxidized rock, but one trench shows over six feet of loose oxidized material. Consequently, for a proper examination of the deposit, it would be necessary to prospect below this shallow rusty surface by means of open cuts through the weathered rock, by drilling, or by shafts.

The porphyry is cut by numerous veinlets of quartz which in places carry visible gold, that frequently occurs near the contact with the porphyry and also in the wall rock, near the veinlets. In one deep trench there are several flat-lying quartz veins from a fraction of an inch to two inches in width. In other places the quartz veins may be irregular in their distribution, the whole mass occurring like a stockwork. It is quite likely the quartz veins are genetically connected with the porphyry, being the filling of tension cracks that have developed on the cooling of the rocks, while the gold has accompanied the quartz in the formation of these veins. Sometimes gold can be observed deposited on grains of iron pyrites in the quartz or along the wall rock. A few samples were taken from the Davidson by the writer. One of these, from the surface of the porphyry in a trench on claim 5372, gave on assay \$10.00 per ton over a length of 15 feet. The porphyry here was not so altered as is frequently seen, but visible gold was observed in minute quartz veinlets near the place from which the sample was taken.

Another surface sample from a long trench at the northeast corner of the claim gave on assay a value of \$15.20 over a length of ten feet in the trench. Several specimen samples of quartz and porphyry carrying iron pyrites gave values of 80 cents to \$2.00 per ton. None of these assays are quoted as representative of the actual value of the whole mass of the porphyry, but indicate its gold-bearing character. It may be found on extended examination that there are isolated parts of the porphyry which are sufficiently enriched with gold to be of economic value.

The following is a description of a microscopic examination of gold-bearing porphyry and quartz from Davidson claim 5372:

Orthoclase crystals are set in a groundmass of smaller feldspar crystals with a little chlorite in flakes and scattered crystals of apatite. Calcite is abundant as a secondary mineral. Quartz occurs in small secondary masses and in veinlets. Cubes and irregular grains of pyrite with an oxidized surface of limonite are frequent in the porphyry and also in the quartz veinlets. The quartz veinlets contain clear secondary feldspar, plagioclase and microcline moulded on the older feldspars of the porphyry. Vein calcite also accompanies the quartz in the veinlets, while native gold occurs near the wall rock in the quartz. A small amount of copper pyrites is occasionally seen. None of the rarer minerals, like the tellurides, have been recognized in any of the samples examined.

Otisse Claims (5379-5380).—These claims lie directly east of the Davidson group, and, owing to a somewhat deeper covering of drift and a smaller amount of trenching, the distribution of the rocks is not as well known.

In the northwest part of claim 5379 the orthoclase porphyry is well exposed. There is also a surface oxidation similar to the Davidson, with an amount of loose brown earthy material in which trenches were made. Gold has been found in a number of pits in the same association as in the porphyry on the Davidson.

To the east of this outcrop other occurrences of porphyry have been located by Sam Otisse in heavily timbered country; it is probable that a band of porphyry extends through the northerly part of the claims.

Near the centre line of the claims, a few chains north of the south line, there are outcrops of rusty weathered schist in which native gold has also been discovered. This band of rock lies to the south of the porphyry band. Below the oxidized surface the rock is light grey in color and spotted with pyrite. Examined under the microscope it contains much secondary silica, calcite, sericite, and iron pyrites, indicating that the rock has been entirely altered by replacement from its original composition. Mr. Otisse discovered gold at several other places on his claims in rocks which are of different character from those described above.

An examination of these properties in January last resulted in options being taken on these and adjoining claims, and it is expected that during the summer of 1918 a thorough examination will be made to prove their possibilities as gold producers.

Otisse Claim (5376).—This claim lies north of the Davidson claim, 5372. The rocks are largely schistose sedimentary rocks intruded by narrow porphyritic dikes. Six chains north of the Davidson claim there is a quartz vein striking nearly east and west and three to four feet wide in places. It contains, in parts, copper pyrites, iron pyrites, and galena. Fragments of grey porphyry in the quartz suggest that the vein was formed along an old porphyry dike. Gold values are reported from this vein. A selected sample of quartz, galena, and copper pyrites contained \$1.20 in gold per ton.

In the southwest part of the claim there is a narrow red porphyry dike that strikes northwesterly to the Robb claim. It contains quite large crystals of orthoclase, and is probably a narrow dike representative of the stock-like mass of red porphyry on the Davidson. Gold is reported to occur in this dike.

O'Connell Claims (5389-5390).—On claim 5389, adjoining the boundary line between Powell and Cairo, there is a reddish feldspar porphyry dike that intrudes a slate-like rock of Keewatin age. This porphyry is much harder than that on the Davidson and Otisse claims, and does not show so heavy a mineralization with iron pyrites. It is cut by quartz veinlets, and has been partly prospected by stripping and a shallow open cut. Low values in gold from this material are reported by the owners.

On claim 5390, one mile south, work was done on a band of blackish chertlike rock cut by quartz veinlets with pyrite, from which low gold values were also obtained.

Fluorite and Barite.

Fluorite (fluorspar) has been found in small quantity in a number of quartz veins in Cairo and Alma townships, but none of the deposits examined are of commercial value. Owing to the widespread occurrence of the mineral, it is possible that prospecting might result in the finding of economic deposits. The mineral is of a deep purple color, occurring in small masses in the quartz or in the wall rock adjacent to the veins. It is also present in the Biederman barite vein. One occurrence where the fluorite is in the quartz is on the Harvey claim, No. 18285, west of the road from Fox rapids north to the Craig claims. This vein is about seven inches wide, strikes N. 75° E., and has been traced several hundred feet. Some pieces of fluorite, two inches across, were taken from the vein. All the showings of fluorite are in the syenite.

Veins containing barite occur in several parts of the area. These are generally small, but two deposits have been found which would be of commercial value were they nearer railway transportation. These are the Biederman deposit in Cairo township, and a deposit near Yarrow lake in Yarrow township.

Western Branch C. M. I. Annual Meeting

The annual meeting of the Western Branch of the Canadian Mining Institute was held at Vancouver, B.C., on May 27th, when there were present representatives of the mining industry of all sections of the Province.

It was agreed that steps would have to be taken to shake up the organization, it being the opinion that it had not been taking its proper part in the development of the industry in the West during the past year or more. In the selection of officers, therefore, care was taken to appoint men who can be depended upon to interest themselves as members of the C.M.I. in all problems, small or large, affecting Provincial mining.

The following committee was appointed: Mr. J. D. Galloway, Provincial Resident Engineer of Mineral Survey, District No. 2, with headquarters at Hazelton, B.C.; Mr. George Winkler, of Victoria, B.C.; Mr. John Hunt, General Superintendent of the Canadian Western Fuel Co., Nanaimo, B.C.; Mr. Thomas Graham, General Superintendent of the Canadian Collieries, Cumberland, B.C.; Prof. N. Turnbull, Professor of Mining at the University of British Columbia; Prof. J. G. Davidson, Professor of Physics at the University of British Columbia; Mr. A. B. Clabon, President of the Vancouver Chamber of Mines; Mr. E. A. Haggen, Editor of the Mining and Engineering Journal of Vancouver, B.C.; Mr. Robert R. Bruce, manager of the Paradise Mine, East Kootenay, B.C.; Mr. S. S. Fowler, manager of the New Canadian Metal Co., B.C.; Mr. Oscar Lachmund, General Manager of the Canada Copper Corporation; and Mr. E. E. Campbell, Superintendent of Mines of the Granby Consolidated Mining and Smelting Corporation; Mr. R. H. Stewart, manager of the Sunloch Mines, was made Chairman, and Mr. W. Fleet Robertson, Provincial Mineralogist, Vice-Chairman.

For the purpose of keeping informed on problems affecting every branch of mining it was decided that the Committee should be given power to appoint sub-committees whose duty it would be to keep in touch with matters affecting the classes of mining work to which they were assigned and in the selection of which the special qualifications of the respective members would be the only consideration. These sub-committees will be as follows: Coal, Copper-Gold, Silver, Lead and Zinc, Legislation, Membership. These smaller bodies, composed of competent men, will keep the Association posted and make recommendations as to its policy in respect of all questions of interest to mining men. It is the hope that in this way the C.M.I. may make its voice heard with effect in the development and the administration of the mining activities of British Columbia.

The meeting was marked by three interesting papers. One by Mr. Frederick Keffer, read by Mr. W. M. Brewer, was entitled "Flotation Practices at Highland Valley Mines." Another on "Petroleum in British Columbia" was by Mr. E. A. Haggen, and a third by Mr. E. E. Campbell, of the Granby Consolidated, was on "Mining Operations at Anyox, B.C."

ELECTRIC SMELTING OF IRON ORES OF B.C.

Dr. Alfred Stansfield, of Montreal, has accepted a commission at the hands of Hon. Wm. Sloan, Minister of Mines, acting on behalf of the British Columbia Government, to make a full investigation into the commercial possibilities of the application of electrical smelting methods to the development of the iron ore resources of the Province. Dr. Stansfield is expected to reach Victoria, B.C., about the middle of the month of June. All the information available to the Department of Mines, as well as the services of one or more of the Provincial Resident Engineers, will be placed at his disposal, so that he can count on having every facility for the immediate commencement and the uninterrupted pursuit of the undertaking.

It was Mr. Sloan's opinion that, in view of the recent advances made in electric-metallurgy, it was essential that the views of an expert be secured as to the adaptability of British Columbia's iron ores to electric smelting, particularly at a time when there are such opportunities and so strong a general demand for the economic development of the long dormant iron deposits of this section of Canada. This would be Dr. Stansfield's first duty and he would, therefore, have to make a close study of the character of the contents of the magnetites and hematites of the Province. He then would go into the various problems in connection with the installation of an electrical smelting plant, its cost, construction and so forth and would follow this up with an estimate of the cost of production of iron by this method from the ores with which the plant would be supplied. He also would be able to give valuable information as to the quality of the iron so produced. All this was information which would be of the utmost assistance in the guidance of those contemplating investment in the manufacture of pig iron from British Columbia ores and in the building up of kindred industries in the Province.

Dr. Stansfield is Professor of Metallurgy at McGill University and a consulting metallurgist of the highest standing in Canada. Before coming to Canada, about 10 or 12 years ago, he had established a reputation in England. For years he has been consulted by the Dominion Government on all electro-metallurgical questions, besides being the advisor of most of the steel manufacturing concerns of the East with reference to the production of electro-smelted high-grade steels. In 1914 he was engaged by the Dominion Government to investigate the electro-smelting of iron in Sweden, on which he prepared a very instructive report. He has held the position of secretary of the Iron and Steel Institute of Canada and is secretary of the Iron and Steel Section of the Canadian Mining Institute.

NEW DOME DIRECTOR.

Toronto, June 12.—The annual meeting of the Dome Mines Company was held yesterday afternoon at the office of Mr. Alex. Fasken. It was announced that the main shaft had just reached the 1,250-foot level, where a station would be cut and a drift started to the Dome Extension line. No definite promise was made for the re-opening of the mill closed some months ago owing to labor conditions.

Mr. W. B. Royce, President of the National Surety Company, New York, was elected to the directorate in place of Mr. J. S. Wilson, Massey, Ont. The chair, in the absence of President De Lamar, was occupied by Mr. J. S. Edwards, the First Vice-President.

Ontario's Metalliferous Production

First Quarter, 1918.

Returns received by the Ontario Bureau of Mines for the three months ending March 31st, 1918, are tabulated below. For purposes of comparison the quantities and values are given for the corresponding period in 1917. **Summary of Metalliferous Production—First Quarter of 1918.**

Product.	Quantity,		Value \$.	
	1917	1918	1917	1918
Gold ozs.	127,692	113,387	2,601,760	2,265,521
Silver " 3,945,957	4,114,856	2,831,873	3,740,843	
Cobalt (metallic) . lbs.	84,710	37,545	78,668	75,625
Cobalt oxide	83,014	81,760	66,798	130,486
Nickel oxide	5,495		550	
Nickel (metallic)		44,154		17,662
Other Cobalt and Nickel Compounds	118,292	143,381	13,695	18,386
*Nickel in matte . tons	10,141	9,677	5,070,410	5,806,200
*Copper in matte	5,063	4,727	2,025,227	1,748,990
Copper Ore	1,507		44,097	
Iron Ore	23,035	32,530	58,205	127,916
Pig Iron	163,020	148,752	2,743,441	3,948,209
Molybdenite, concentrates . lbs.	25,073	17,410	32,202	24,548
Lead, pig	263,046	60,283	27,290	5,066

* Copper in matte was valued at 20 cents and nickel at 25 cents per pound in 1917. For 1918 the values have been placed at 18½ and 30 cents per pound respectively.

Gold.

Production for the quarter shows only a small decrease which is a creditable showing considering the various handicaps under which gold miners are laboring. The Hollinger Consolidated had an increase in production. This was offset, however, by the closing down of the Dome mill. The Croesus mine in Munro township has closed down temporarily. At Kirkland Lake a new producer, the Lake Shore, has been added to the list. During the quarter 262,577 tons of ore were milled with a recovery of 113,387 ounces of gold and 20,221 ounces of silver as compared with 350,916 tons milled during the corresponding period in 1917. Hollinger produced 68,804 ounces of gold and McIntyre 21,461 ounces, the next largest producer being the Porcupine V.N.T. The Patricia Syndicate at Boston Creek expect to have their new mill in operation about June 1st.

Silver.

Shipments of silver for the first quarter of 1918 show a small increase in quantity and a considerable increase in value. The average New York price for the period was 87.5 cents per fine ounce or nearly 12 cents increase as compared with the corresponding period in 1917. The passing of the Pittman bill in the United States recently has established virtually a price of \$1.00 per ounce. Companies shipping one quarter million ounces or over are named in order: Nipissing, Kerr Lake, Mining Corporation of Canada, Buffalo, O'Brien and Coniagas. The Mining Corporation of Canada has been remodeling its mill in order to re-treat a large tonnage of tailings from the Cobalt Reduction mill. At the McKinley-Darragh a new 200-ton oil flotation plant has been put in operation. Of a total of 4,114,856 ounces shipped, 20,221 ounces is credited to silver recovered from gold ores.

Refineries: There were treated at Southern Ontario refineries during the quarter 1,242 tons of ore and concentrates and 1,483 tons of residues from Cobalt and out-lying silver camps. Silver bullion recovered was 1,610,989 ounces, worth \$1,394,599. In addition, arsenic, cobalt and nickel oxides and sulphates, nickel carbonate, metallic nickel and metallic cobalt were produced. Of the latter, 22,752 lb. was used in the manufacture of "stellite," which is a cobalt alloy used as a high speed cutting tool. One feature of note is the

great increase, 100 per cent., in value of cobalt metal and oxide due to the increasing uses and demand for these products.

Nickel-Copper.

Production from Copper Cliff and Coniston smelters for the quarter shows a small decrease as compared with the same period in 1917. Ore was raised from the Creighton and Crean Hill mines of the Canadian Copper Co., the Alexo; and the following mines of the Mond Nickel Co.—Garson, Victoria No. 1, Worthington, Levaack and Bruce. Of a total of 354,689 tons raised, about 70 per cent. came from the large and rich Creighton ore-body. There was 325,386 tons of ore smelted in the period, with a resulting product of 17,992 tons of nickel-copper matte.

The British America Nickel Corporation has acquired a site to erect its \$1,000,000 refinery on the Quebec side of the Ottawa river, between Aylmer and Hull. The new refinery of the International Nickel Company of Canada at Port Colborne is nearing completion.

Iron Ore and Pig Iron.

Shipments of iron ore were made from the Helen and Magpie mines of the Algoma Steel Corporation. Hematite ore from the Helen is shipped to the Magpie, where it is mixed with siderite ore and roasted. The entire shipments from the Magpie went to the Sault blast furnaces. From Moose Mountain, Limited, Sellwood, shipments were made of magnetic concentrates, briquetted and converted to hematite in a kiln. Only 447 long tons were exported to the United States during the quarter.

At Sault Ste. Marie, Port Colborne, Hamilton and Deseronto, eight blast furnaces were in operation. The tonnage smelted was 34,552 tons of Ontario ore and 260,476 tons from the United States. As shown by the table, the output of pig iron was considerably less than for the corresponding period last year.

Molybdenite.

Molybdenite ore, to the extent of 1,295 tons, was treated by the Mines Branch, Ottawa, and by the Renfrew Molybdenum Mines, Ltd., at Mount St. Patrick. The output of the last mentioned company is shipped direct to France. There are works at both Orillia and Belleville for the production of ferro-molybdenum.

Lead.

The entire output of pig lead resulted from the operations of the Galetta lead mine and smelter owned by the Jas. Robertson Estate, Montreal. During the quarter 3,347 tons of ore was mined. The smelter operated during the last few days of March only. Operations by the Kingston Smelting Company ceased in December of last year.

The Order-in-Council dated May 31st, 1918, with reference to assessment work is as follows:

"Upon the recommendation of the Honorable the Minister of Lands, Forests and Mines, the Committee of Council advise that on any mining claim where in consequence of the provisions of The Mining Act of Ontario and a certain Order-in-Council dated 26th May, 1917, two instalments of work are required to be performed, wholly or in part, within the space of twelve months, the time for performing the second of such instalments be extended twelve months, and the time for performing each and every subsequent instalment of work, if any, on such claim, be likewise extended twelve months; and that in computing the time within which any such work is required to be performed, the period of time necessary for such extension be excluded."

THE MADOC AREA.

The development of the fluorspar mining industry has again directed attention to the Madoc area. At Madoc 80 years ago there was located one of our first iron furnaces, iron ore being obtained from the Seymour mine. Thirty years later a rich gold deposit was discovered a few miles from Madoc and consequently the area received considerable attention from prospectors. Many mineral deposits were found and some of them worked. During the past few years a tale mine and a pyrite mine in the area have been regularly and profitably operated.

The Madoc area was geologically re-surveyed by W. G. Miller and C. W. Knight in 1912 and their report and map were published in the annual report of the Ontario Bureau of Mines, 1913. The rocks are described in detail and their relationships discussed. Most of the rocks are pre-Cambrian, but a considerable portion of the area is covered by Palaeozoic sediments. The Henderson tale deposit at Madoc occurs in a crystalline dolomitic limestone. The iron pyrites deposits near Queensboro occur as lenses in contact with rusty schists and quartzite near an intrusive mass of felsite.

Most of the fluorspar produced is used as a flux in basic open-hearth steel furnaces. Probably four-fifths of the output is consumed in this way, fluorspar being much prized for its property of increasing the fluidity of the molten mass in the furnace and also for its assistance in the removal of phosphorous and sulphur. It improves both the physical character and chemical composition of furnace products.

Fluorspar is used in the manufacture of opalescent glass and enamel ware. For this purpose a very good grade of ore is required.

The term "gravel spar" is often used to designate a comparatively impure grade of spar that is not suitable for such purposes as glass and acid manufacture, though suitable for use in steel furnaces and iron and brass foundries. The term "gravel" is also used for disintegrated fluorspar, as distinct from "ground" spar. The natural coarse product is commonly called "lump."

In Kentucky, fluorspar occurs in veins in fault fissures cutting limestones, sandstones and shales of Carboniferous age. The associated minerals are barite, calcite, galena and sphalerite.

In Illinois, the fluorspar deposits fill fault fissures in Lower Carboniferous limestones and sandstones. The associated minerals are calcite, galena, sphalerite and occasionally pyrite or chalcocopyrite.

SMITH & TRAVERS COMPANY, LIMITED.

The Smith & Travers Diamond Drill Co., Ltd., and the Smith & Durkee Diamond Drilling Co., Ltd., both of Sudbury, Ont., have disposed of all their assets to a new company to be known as the Smith & Travers Co., Ltd.

Dominion Letters Patent incorporating the company have been granted, giving very wide powers. The capital stock is \$500,000, divided into 5,000 shares of \$100 each. The management will be made up from the active members of both companies. The scope of the company is very great. Each department will be in charge of the man who appears best suited for the work. It happens that every man on the staff has had several years of active experience in the special work he is chosen to superintend. The organization consists not only of men of long practical experience, but also technical men as well, so that every phase of the work of exploring mineral lands can be done intelligently.

Scientific exploration is done for three reasons, namely, to determine tonnage and grade for financing, structure of ore-bodies for the mining man and the quality of ore-bodies for the metallurgist. To do this requires not only a knowledge of boring holes, but also a knowledge of engineering and structural geology. Therefore, with such an organization, it is hoped that a greater and broader service can be given the mining industry of Canada.

The Board of Directors have elected T. E. Smith, President, Thomas Travers, Vice-President, and T. H. Hale, Sec.-Treas. Mr. Smith has had over thirty years' experience in diamond drill exploration in the United States and Canada. The new company is most fortunate in retaining his services because of his long experience, broad acquaintance and business ability. Mr. Travers and O. R. Smith, who have had charge of field work for several years, will continue in the same capacity. The shop, maintenance of outfits and transportation will be in the hands of Wallace N. Smith. C. H. Hitchcock, for the past seven years Exploration Engineer for the Dominion Nickel Copper Company, now the British America Nickel Corporation, Ltd., and the Canadian Copper Company, will act as geologist and have charge of the company's land interests.

The company owns thirty-four diamond drilling outfits. These vary in capacity from the smallest types, suitable for portaging over the lakes and rivers of the North country, to large capacity outfits capable of drilling to a depth of 3,000 feet. The company is now drilling at the Creighton Mine at a depth of 2,700 feet vertically. This is deeper than any shaft or bore hole ever before sunk in the Sudbury nickel district.

In order that these many outfits may be kept in first-class condition, the company maintains its own shop for repairs and maintenance. This is an important feature and insures complete and first-class equipment on the contracts, hence better service to those who may employ the company.

A geological department with all facilities for examination work, geological mapping and laying out of schemes for exploring mineral lands, is maintained. The long experience of the management in boring holes, proper schemes of exploration to be applied to different types of ore bodies, proper handling of core, analysis and computation of tonnage, makes it possible for the company to give the mining industry the best assistance obtainable.

Hereafter it is prepared to assist in the development of mineral lands by doing exploratory work on meritorious properties in return for an interest. On account of the company's facilities for scientific exploration and sale of properties, it is hoped that the owners of mineral lands and the company may be mutually benefited. It is felt that in time this may become the most important part of the company's business.

It happens, almost without exception, that some member of the present staff of Smith & Travers Co., Ltd., has assisted in some capacity in every exploration that has ever been done in the Sudbury Nickel District. The information that the company has regarding land ownership, extension ore-bodies, and areas favorable for future exploration, is enormous. The facilities offered mining companies and individuals who are interested in nickel lands either as buyers or sellers, are very great.

Probably no mining district in Canada offers scientific explorers of mineral lands quicker or greater rewards than the Sudbury Nickel District, Canada's richest mining camp.

Ontario's Mineral Wealth

ONTARIO IS CANADA'S PREMIER MINERAL PROVINCE, the 1917 output being 46 per cent. of the total production from Canada.

The rapid growth of Ontario's Mineral industry may be gleaned from the following figures:

Year.	Value.	Year.	Value.
1893.....	\$6,120,753	1914.....	\$46,295,959
1903.....	12,870,593	1915.....	54,245,679
1913.....	53,232,311	1916.....	65,303,822

Preliminary returns show a production for 1917 exceeding \$71,000,000 in value.

NICKEL: The Sudbury area produces 85 per cent. of the nickel of the world. In 1917 the nickel-copper matte output contained 41,887 tons of nickel valued at \$20,943,500 and 21,197 tons of copper worth \$7,842,890.

SILVER: Chiefly from Cobalt and outlying camps, 19,479,807 ounces of silver, worth \$16,183,208, were produced in 1917. The total silver production from these camps up to the end of 1917 was 274,723,972 ounces, valued at \$151,950,561.

GOLD: For 1917 the gold output was 420,893 ounces, worth \$8,698,735. From the Porcupine camp the total production to the end of 1917 was \$36,430,066. At the Kirkland Lake camp the following mines are producing gold: Tough - Oakes, Teck - Hughes and Lake Shore.

Dividends and bonuses paid to the end of 1917 were \$71,177,116 from the Cobalt Silver Camp, and \$11,486,167 from Porcupine and Kirkland Lake Gold Camps.

The total valuation of the chief metals produced in Ontario to 31st December, 1917, is as follows:

Silver	\$167,611,708	Nickel	\$110,170,120
Pig Iron	77,561,181	Gold	42,362,383
Copper	41,414,290	Cobalt	4,303,769

Ontario's mineral resources cover practically the entire list of metallics and non-metallics with the exception of tin and coal.

The producing camps are readily accessible by railway, the climate is invigorating and healthful, water power is abundant, and other conditions are favorable for mining.

FOR GEOLOGICAL MAPS, ILLUSTRATED REPORTS, MINING LAWS, AND LIST OF PUBLICATIONS, APPLY TO THE

ONTARIO BUREAU OF MINES
PARLIAMENT BUILDINGS
TORONTO, CAN.

Fluorspar Mining in Ontario

The manufacture of munitions and the shortage of shipping has resulted in a more intensive investigation of the mineral resources of North America. Minerals used in the iron and steel industry have naturally been in great demand and the difficulties in connection with importing from the usual sources have given added value to domestic deposits. The unusually large production of special steels has made it necessary to utilize more extensively Canadian ores of such metals as chromium, nickel, molybdenum, cobalt, etc., and also all minerals needed in metallurgical works. Among the latter minerals is fluorite, which is used as a flux. The production of fluorite in Ontario has never been large; but has recently become important and is expected to increase considerably in the near future.

and in foundries. Fluorspar is also used in comparatively small quantities, however, in the manufacture of hydrofluoric acid and various fluorides and fluosilicates.

Fluorspar Properties near Madoc, Ontario.

Canadian steel furnaces use annually from 10,000 to 15,000 tons of fluorspar; but until recently almost all of this was imported. During 1916 shipments from the Madoc district became notable, amounting to 1,284 tons valued at \$10,238. During 1917 there was produced 4,326 tons valued at \$66,474. It is expected that in both tonnage and in value per ton the production during 1918 will far exceed that of the previous year. A number of properties are being developed and the prospects for a busy summer are excellent.

FLUORSPAR PROPERTIES NEAR MADOC.

Madoc Tp.

- A.—Lot 6, Con. 1—O'Reilly.
- B.—Lot 4, Con. 1—Wallbridge.
- C.—Lot 3, Con. 1—Ponton.
- D.—Lot 2, Con. 3—McIlroy.
- E.—Lot 1, Con. 1—Lee.
- F.—Lot 1, Con. 4—Bailey.

Huntingdon Tp.

- G.—Lot 8, Con. 14—North Reynolds.
- H.—Lot 9, Con. 14—Canadian Fluorite Ltd.
- I.—Lot 7, Con. 13—South Reynolds.
- J.—Lot 11, Con. 13—Perry.
- K.—Lot 1-2, Con. 12—Herrington.
- L.—Lot 13, Con. 12—Canadian Industrial Minerals, Ltd.
- M.—Lot 12, Con. 11—Canadian Industrial Minerals, Ltd.
- N.—Lot 14, Con. 11—Canadian Industrial Minerals, Ltd.
- O.—Lot 15, Con. 10—Canadian Industrial Minerals, Ltd.
- P.—Lot 16, Con. 9—Canadian Industrial Minerals, Ltd.



Map showing location of fluorite properties in Madoc area.

When heat is applied to the charge in an iron or steel making furnace, there commonly results the formation of a lighter fluid mass, containing most of the impurities, which rises to the top of the molten mass. It is the function of the furnace process to thus separate the useless and harmful substances from the metal. It was long ago found that a small quantity of fluorspar added to the charge very greatly increased the fluidity of many slags and thus allowed the separation to be more rapidly and completely made. Fluorspar is, therefore, regularly used in iron and steel works

Canadian Fluorite, Ltd., through J. W. Bradley, is operating the Kane property, Lot 9, Con. 14, Huntingdon, from which shipments are being made to the new steel plants of British Forgings, Ltd., at Toronto. The shaft is 25 ft. deep on a vein about 9 ft. wide. The vein matter is largely calcite. At 25 ft. depth there is considerable fluorite in the vein. The plant consists of a 325 cu. ft. compressor, 35 h.p. upright boiler and an 8 x 12 hoist. E. D. Hall is superintendent. Ten men are employed.

Canadian Industrial Minerals, Ltd., has about 800 acres, including Lot 13, Con. 12; Lot 14, Con. 11; Lot 15, Con. 10; Lot 16, Con. 9, and part of the north half of Lot 12, Con. 11, Huntingdon township. The first mentioned, Noyes lot, was operated formerly by Wellington & Munro.

A shaft has been sunk 100 ft., and at the bottom of the shaft there is 9 to 12 ft. of clear fluorspar. At 50 ft. a level is established and 140 ft. of drifting done. The company is installing a 784 cu. ft. Ingersoll-Rand compressor electrically driven by 125 h.p. motor. Plant on the property consists of 2 boilers, 35 and 60 h.p., and a 6 x 8 hoist.

C. E. Watson is general manager of Canadian Industrial Minerals, Ltd. A. W. Grierson is resident manager.

The Wallbridge property, west half Lot 1, Con. 4, Madoc, has produced 380 tons of spar. The vein has been stripped 500 ft. It varies from one to three feet

The Bailey property, Lot 1, Con. 4, Madoc township, is being unwatered by J. W. Bradley, the property being held under option for Canadian Fluorite, Ltd. The shaft is 40 ft. deep and 35 ft. of drifting has been done at the 40 ft level.

This deposit was opened late in 1916 by the Hungerford Syndicate. (Harry Hungerford and Robert Gilchrist.) Robert Phillips was in charge of operations.

The vein matter is well crystallized and some splendid spar was taken out during development.

The south Reynolds property, Lot 7, Con. 13, Huntingdon township, is under option to Chas. Henrotin. Two carloads of fluorite have been shipped from an open cut on the vein, the vein is narrow, being under 18 in. wide. About 150 ft. has been exposed in the open cut.

The Herrington property, Lots 1 and 2, Con. 12, Huntingdon, has been leased to Chas. Henrotin. Thirteen tons have been shipped. The vein has been stripped for 250 ft. It is about 18 in. wide.



Fluorite from Madoc, Hastings Co., Ont.

wide. A second vein, 700 ft. west of the first, has been uncovered for 100 ft. In a pit 15 ft. deep on this second vein at the boundary with the Ponton property, the vein is 6 inches wide. On the Ponton property, west half Lot 3, Con. 1, Madoc, a vein stripped for 300 ft. is up to 3 ft. wide.

From the Perry property, Lot 11, Con. 13, Huntingdon township, operated by Cross & Wellington, about 3,000 tons of fluorspar has been shipped, the property is shut down at present owing to water trouble. It is the intention of its operators to install a double action, motor driven Cornish pump to overcome this difficulty. There are three shafts which are respectively 35 ft., 80 ft., and 95 ft. deep. Plant consists of a 50 h.p. boiler, 470 cu. ft. compressor driven by 75 h.p. motor and an 8 x 12 hoist.

The Lee property, west half Lot 1, Con. 1, Madoc township, is held under lease by Chas. Henrotin. Five cars have been shipped from an open cut. The vein is 3 ft. wide at its widest parts. The open cut is 500 ft. long and is in places 8 ft. deep.

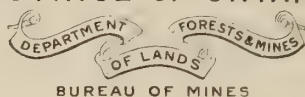
On the North Reynolds property, Lot 8, Con. 14, Huntingdon township, there is a pit 10 ft. deep.

The McIlroy property, Lot 2, Con. 4, Madoc, is operated by Mineral Products, Ltd. The vein is one to three feet wide. It is developed by a shaft and an open pit.

Fluorspar has recently been found in a number of quartz veins in Cairo and Alma townships in the Metachewan gold area, Northern Ontario. According to Mr. A. G. Burrows, the mineral in these deposits is of a deep purple color.



PROVINCE OF ONTARIO



BUREAU OF MINES

Mining in Eastern Ontario

Eastern Ontario is noted for the number and variety of its minerals, which are found chiefly in the pre-Cambrian rocks. These minerals include lead, molybdenite, gold and iron among the metallics. In the non-metallic list the following were mined in 1917, the arrangement being in order of the value of output: Graphite, Talc, Iron Pyrites, Mica, Feldspar, Fluorspar, Corundum and Quartz.

THE TOTAL VALUE OF THE MINERAL OUTPUT FROM EASTERN ONTARIO IN 1917 WAS APPROXIMATELY \$1,186,000.

This does not include materials of construction, such as stone, sand and gravel, cement, lime, or clay products. Other Eastern Ontario minerals include marble, sodalite, arsenic, and apatite or phosphate of lime.

As to the importance of these resources, it may be pointed out that there is at Madoc the largest deposit in North America of high-grade talc, the greatest body of high percentage potash feldspar (Richardson mine) at Desert lake in Frontenac county, the most important amber mica mine (Lacey) at Sydenham, and the greatest graphite mine (Black Donald) at Calabogie.

Incidental to the war many minerals have come into prominence, among which may be mentioned iron pyrites, molybdenite and fluorspar. The first-mentioned is mined at Queensboro, Sulphide and near Flower station in Renfrew county. The highest grade iron pyrites deposit in Canada is located at Queensboro, in Hastings county. Molybdenite is very widely distributed in Eastern Ontario, and fluorspar is mined near Madoc, in Hastings county.

The Ontario Bureau of Mines issued a geological Report in 1913 with accompanying maps of parts of Eastern Ontario. This and other reports dealing with the minerals of this part of the Province are available on application to

Ontario Bureau of Mines,
Parliament Buildings,
Toronto.

G. H. Ferguson,
or
Minister of Lands, Forests and Mines,
Toronto.

THE MADOC TALC INDUSTRY.

The Madoc district, Hastings County, which is receiving much attention at present from companies developing fluorspar deposits is the chief source of Ontario's tale. The production of this mineral was seriously interfered with by the war as increased ocean freights made it impossible to continue exports to Great Britain. Exports to the United States have, however, greatly increased and the production in 1917 was 16,076 tons valued at \$179,554, as compared with 11,810 tons valued at \$111,489 for the previous year. The greater part of the tale comes from the Henderson mine near Madoc. It is ground in the mill of G. H. Gillespie & Co. at Madoc. The Anglo-American Tale Corporation has erected a mill on their property adjoining the Henderson mine.

Ground tale is used as a filler in the manufacture of paper, cotton, rubber, etc., and a considerable quantity is used in the form of talcum powder.

The Mundie mine, Lot 25, Con. 6, Madoc township, Hastings Co., Ontario, is being re-opened by the Bannockburn Pyrite Mining Co. An open pit 50 by 100 ft., and 60 ft. deep has been unwatered. J. A. Anderson, of Bannockburn is manager.

The International Pulp Co. of Gouverneur, N.Y., is prospecting the Pitts farm property, Lot 14, Con. 14, Huntingdon township, Hastings Co. An incline shaft has been sunk 50 ft. E. Brownson is manager.

For some years Mr. George Gillespie has been largely responsible for keeping Madoc, Ontario, on the mining map. Mr. Gillespie is the moving spirit of the tale mining industry of Ontario and his mill is located at Madoc, where it is close to Canada's greatest tale mine.

During the past year a number of mining men have been visiting Madoc and vicinity in an endeavor to obtain fluorite to supply the needs of Canadian iron and steel manufacturers. Their activity has resulted in the establishment of practically a new industry at Madoc—the mining of fluorspar.



Map of Ontario, showing location of Madoc area.

LEAD AND ZINC IN EASTERN ONTARIO.

Lead and zinc are not produced in large quantities in Ontario; most of Canada's production of these metals being made by British Columbia. There was produced in Ontario in 1917 ore yielding 1,772,512 pounds of lead, valued at \$172,601. During the first quarter of 1918 there was mined 3,347 tons of ore. The only producer is the Galetta lead mine and smelter owned by the Jas. Robertson Estate. The Kingston Smelting Company's smelter ceased operation in December, 1917.

A report by W. L. Uglow on the lead and zinc deposits in Ontario was published by the Ontario Bureau of Mines in 1916. He says of the Galetta deposit:

"The Galetta lead mine is located on Chats island in the Ottawa river, about five miles directly east of the town of Arnprior. The island is separated from the mainland by a narrow channel of the Ottawa river.

"The vein is a fissure-filling of the same type as the Frontenac lead mine vein. Its strike varies from N. 45° W. to due north (magnetic), and consequently it cuts nearly at right angles across the strike of the pre-Cambrian series. It usually has a steep dip towards the southwest. The vein occupies a well-marked fault fissure. Near the northwest end, a small open cut shows on the northeast wall of the vein the steeply-dipping north-easterly striking gneisses of the pre-Cambrian and on the other the flat-lying Paleozoics, indicating a downthrow to the southwest. Horsts of country rock occur throughout the vein, suggesting a fault breccia, while drag-folding is very evident at some places along the fracture.

"The gangue is very largely calcite showing the banded character of a crustified vein, similar in all respects to that of the Frontenac lead mine. In some places in the vein, barite seems to be rather abundant. The chief ore mineral is galena, which occurs in grains, clusters of crystals, and thin sheets, usually parallel to the banding of the gangue."

The statement of Dome Mines, Ltd., for the year ending March 31, shows a profit of \$355,023 during the first eight months and loss of \$118,564 during the last four months.

Added to the loss of \$118,564 for the last four months is \$282,328 for depreciation of plant, thus making a total of 400,893, as against the profits of \$355,023 during the first eight months, and thereby showing a net deficit of \$45,869. In addition to the deficit of \$45,869 are deducted from the surplus as of one year ago war taxes on profits amounting to \$26,384 and dividends of \$100,000, thereby reducing by \$172,253 the surplus of the preceding year. The surplus as of March 31, 1917, was \$697,051, as compared with \$524,797 as of March 31, 1918.

Goudreau, Ontario, 177 miles north of Sault Ste. Marie, on the Algoma Central railway is attracting attention as a possible gold district. The Goudreau pyrite mine, operated by the Nichols Chemical Company, is a big producer and considerable mining activity has been carried on in the past few years. It is not surprising that prospecting has resulted in the discovery of gold.

According to the "Sudbury Star," engineers Alderson and Reid have investigated the recent discoveries. The properties of D. J. McCarthy and J. B. Miller will probably be explored under option by the interests these engineers represent.

The "Ingersoll-Rogler" Air Compressor Valve

By A. W. SWAN.

The air compressor is in some respects similar to the steam engine, but the indicator card is traced in the reverse direction, and the cut-off point on the steam card becomes the release point on the air card. It follows that the valve requirements for engine and compressor are not entirely the same, and as a matter of fact the development of the two types have followed different lines. In the steam engine the point of cut-off is important, and in order to vary the cut-off, both for economical running and regulation of speed, the steam discharge valve in all forms is mechanically operated. The air compressor is regulated either from the driving end or by some form of unloader, and the shape of the compression line is looked after by the water jacketing. Both inlet and discharge valve should open at the proper pressure, open quickly and fully, and close quickly at the right time. It follows that pressure is the only important factor, and that while for the steam engine mechanical valve operation is necessary to control the release and compression, there is no such need for the compressor, hence the friction and complication of mechanical control is unnecessary.

The alternative to the mechanically operated valve is found in the spring-controlled valve. In addition to the desirable features mentioned above, the spring-controlled valve should be such that the spring is not heavy enough to absorb useful power in opening and holding open. It was this feature of the heavy spring that created a prejudice against the spring type of valve. Recent developments in the spring-controlled valve have reduced this wasted power to a minimum.

The tendency in design of spring-controlled valves has been in two directions, towards the finger type, and towards the annular plate type. In the finger type a number of thin strips of steel are held in position over the valve seat. In operation, the valve strips are lifted by the air pressure, and are returned to their seats by their own spring action. This type of valve is simple and has certain advantages, particularly for small compressors, but for the larger machines the annular plate valve is gaining ground. The pioneers in this field were Rogler and Hoerbiger in Austria, who after a long period of investigation and invention developed the Rogler valve. The patents on this continent are held by the American and Canadian Ingersoll-Rand Companies, and the valve is known as the "Ingersoll-Rogler" valve.

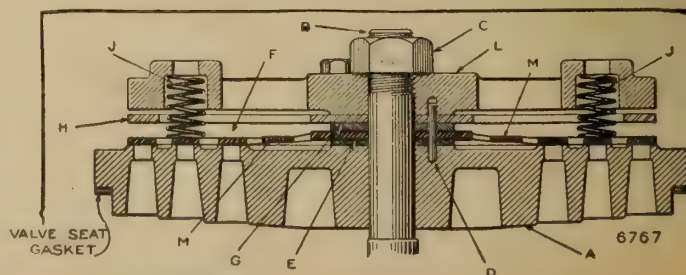
The valve itself consists of a ring shaped plate, "F" in the illustrations, held down on the valve seat and ports by the four coiled springs "J" and the slight tension of the thin flat spring "M." It should be mentioned here that the spring "M" is made in one piece with the valve, and as "M" is forced to rise and fall in the same position by the dowel pin "D," the valve must also reseat itself every time in exactly the same position. In this little feature lies one of the main points of superiority of the "Ingersoll-Rogler" valve, one which makes it so admirably fitted for high-speed work, for the main difficulty with plate valves has been to have them reseat every time in the same position. It can easily be seen that if the valve rotates ever so slightly each time wear is soon set up and the valve cannot remain tight and leakage results. This would happen with a plate type of valve where the flat spring



Parts of Ingersoll-Rogler Valve and Seat.

was not rigidly connected to the valve ring, for instance, if it were clipped or even rivetted to the valve. In the "Ingersoll-Rogler" valve the spring and valve are one piece and cannot rotate.

In operation, as soon as the required pressure is reached the valve rises at once against the coiled springs "J" to nearly its full opening, completing the last 1-32nd to 1-16th against the slight pressure of the buffer plate "H," which brings the valve gently to rest even at high speeds. Owing to the lightness of the valve, its action is very rapid, which gives the double advantage that the opening is prompt, and there is a minimum of inertia to overcome. This inertia factor becomes very important with a valve of the heavy spring type, where the spring not only requires a pressure in excess of the discharge pressure to open, but to keep it open. By experiment it has been found that an "Ingersoll-Rogler" valve requires, for opening, one-third of the pressure required by a valve of equal capacity of the heavy spring type, and two-thirds of the pressure to keep open during the stroke. This means that not only does the "Ingersoll-Rogler" valve reduce the "hump" to be found in the discharge line on the indicator card—and the larger the "hump" the greater the lost work—but it requires one-third less pressure to keep open,



Cross Section of Ingersoll-Rogler Valve.

the saving from this item amounting to 2.9% of the total power. Adding this gain in efficiency to the gain due to less pressure being needed to open the valve—at least 1% of the total power—it is seen that the "Ingersoll-Rogler" valve gives a gain in efficiency measured by actual test of 3.9%, not counting the other advantages of the valve. The design is so simple that there is absolutely nothing to go wrong. The only part that can wear out is the valve itself, which can be easily and cheaply replaced. The integral spring insures tightness, and after a few days the valve is absolutely tight on its seat. The design lends itself to convenience, the valves being placed where they are most accessible at the ends of the air cylinders. There they are best placed for short and straight air passages. The lift is remarkably small, varying from .08 in. to .14 in., hence the valve is silent and well adapted to the high speeds for which it is designed. The lift area equals the port area, and ample port area is provided.

To summarize, the advantages of the "Ingersoll-Rogler" air compressor valve are: The valve is light and requires little power to open and keep open; the lift being low, and the operation of the valve being cushioned, the valve is silent and has very little shock or wear; the valve opens quickly to its full extent, hence is particularly suited to high speed operation; there are no mechanical intricacies to add friction, and the valve does not need adjustment; finally the valve is easily accessible, and can be placed to the best advantage.

LOOKING FOR PLATINUM AND MERCURY IN BRITISH COLUMBIA.

The Dominion Government is turning its attention to the mineral resources of British Columbia for supplies urgently needed for war munitions. Within the last two weeks two members of the staff of the Canadian Mines Department have reached the Western Province on special missions. Dr. Victor Dalmage, assistant Geological Surveyor, is here to report upon two deposits containing mercury on the West Coast of Vancouver Island. Dr. E. Psitevin, Dominion Mineralogist, has come West to learn something more than existing reports give regarding the platinum occurrences of the placer districts of the Provincial interior. The former is in quest of claims located years ago and abandoned either because at that time mercury was not sufficiently valuable to make them worth while or owing to lack of capital. Conditions now, however, are very different and Dr. Dalmage and party will spend the summer thoroughly prospecting the coast of Vancouver Island from Quatsino Sound south. Incidentally he will examine and report on certain copper properties. Besides making a search for platinum in commercial quantities, Dr. Psitevin will go into the matter of British Columbia's resources in chromite.

The announcement of an advance in the selling price of coal in British Columbia is momentarily looked for. That an application to the Fuel Controller for sanction for such a course was expected following the latest increase of 50 cents a day granted the coal miners. It is predicted that the increase will be between 50 and 65 cents per ton.

The Gowganda area has, from the time of the first discovery of silver there, suffered from lack of transportation facilities. It is not surprising that considerable dissatisfaction has been expressed by those who have attempted to develop properties there.

PERSONAL

Mr. D. A. Dunlap, of Toronto, succeeds the late John McMartin as vice-president of Hollinger Consolidated. Dr. W. L. McDougald of Montreal, has been elected a member of the board of directors.

Major W. A. Mensch, E.M., president of the Telluride Chief Extension Mining Company, of San Diego, Cal., is visiting the Kirkland Lake Camp.

Mr. F. C. Worth, of the Three Star Mining Company, now operating the former Calumet and Montana property at Cobalt, is in Chicago. He will return in about two weeks.

Mr. S. Harry Worth, of Philadelphia, president of the Elliot-Kirkland and the Seneca-Superior mine at Cobalt, visited the Elliot-Kirkland and a number of other properties in the Kirkland Lake camp recently.

Sergt. R. Douglas Gregory, who was recently discharged from the Overseas Forces, is now on the engineering staff of the British American Nickel Co.

Mr. J. B. Tyrrell is in British Columbia.

Mr. H. M. Lamb, secretary of the Canadian Mining Institute is in British Columbia.

Mr. W. A. Carlyle is now residing in Ottawa.

Dr. W. F. Ferrier was in Toronto last week. He will undertake further work for the Munitions Resources Commission.

The Vocational Branch of the Invalided Soldiers' Commission gave a dinner at the Engineers' Club, Toronto, on June 4th, under the auspices of the Engineers of Toronto, to thirty American visitors sent by the United States Government to study the Canadian methods of re-educating the returned soldier. The work being done by the Commission was explained by Mr. W. E. Segsworth, who is in charge of the Vocational Branch. Mr. H. E. T. Haultain, Vocational Officer for Ontario, presided.

Mr. T. R. Deaville, Fuel Controller in Manitoba, is quoted as accusing the coal mine operators of British Columbia, Alberta and Saskatchewan as being strangely lacking in business sense and a spirit of co-operation in not starting a campaign with a view to explaining to the people of the Province of Manitoba the quality of the coal of the Western Provinces and giving directions as to the best methods of handling and burning it. He added: "If Winnipeg people get the proper kind of Western coal, and if it turns out that they can get no other, I'm convinced that there will be no serious hardship as a result."

The Granby Consolidated Mining & Smelting Corporation in the course of developing its newly acquired coal bearing areas near Nanaimo, B.C., has driven three slopes. On one, at a depth of 150 ft., a seam, fourteen feet at that point, has been opened up. The management express themselves as satisfied with the results up to date.

Mr. A. H. Curtis, of New York, and Mr. G. C. Miller, of Buffalo, have been chosen directors to succeed Mr. J. S. Wilson and Mr. A. S. Wigmore. The other directors of Dome Extension are W. S. Edwards, Alex. Fasken and J. S. Tomesson.

Mr. W. B. Royce, President of the National Surety Co., of New York, has been elected director of Dome Mines company, succeeding Mr. J. S. Wilson.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Pittsburg-Lorrain.

The ball mill for the Pittsburg-Lorrain Mining Company in South Lorraine, which was manufactured at the Wabi Iron Works, New Liskeard, was shipped to the property about a week ago. An improvement in the tonnage treated at the mill and also in the percentage of extraction is expected to result from the finer grinding made possible by this installation. The advent of successful manufacture of mining machinery at New Liskeard is of great importance to the mining industry of Northern Ontario, owing to the fact that delays in shipment of equipment of all kinds from the south have been very inconvenient of late.

Dividends Declared.

The Mining Corporation of Canada has declared a dividend of 12½ cents together with a bonus of 6¼ cents per share, payable on June 15th to shareholders of record June 1st.

McKinley-Darragh directors have declared the regular dividend of three per cent. payable on the first day of July to shareholders on record at the close of business on June 8th.

Hollinger directors have declared a dividend of one per cent. payable June 17th.

Shortage of Labor.

So keenly is the labor shortage being felt in the prospecting field this season, that claim holders are finding it difficult to secure enough men to even perform their assessment work. A number of contractors for this class of work are refusing orders on this account. The passing of an order-in-council by the Ontario Bureau of Mines recently that where two periods of work fall due in one year, the second period would be extended one year, met with the unanimous approval of the entire prospecting fraternity of the north.

Installing Groch Machines.

Changes now being effected in the mill of the Mining Corporation of Canada will provide for the treatment of about 300 tons of tailings per day, by the oil flotation process, and the plant will gradually be brought up to a capacity of 600 tons per day. Two Groch flotation machines, with a capacity of about 100-tons per day are to be installed at once in addition to the present equipment. It has been decided that the slimes of previous milling operations can be treated by cyanide better than by flotation. The method to be employed will be to pump the slimes from the bed of Cobalt Lake (where it is estimated about half a million tons of slimes and tailings have been deposited from the operations of the mill) to classifiers. Thence the slimes will go to the cyanide portion of the mill, while the sands, after being run through the tube mills, will go over the concentrating tables and then be treated by the Groch Centrifugal Flotation system. The pump being installed will have a capacity of 1,000 tons per day, the excess supply of material will be piled near the mill for convenience of handling in the winter months.

Work Resumed at Genesee.

After slight delay in operations at the lower levels of the Genesee property, owing to water troubles, work is again under way. Added pumping equipment to meet all emergencies has been installed. Work of exploring the fault zone in which ruby silver was discovered a short time ago is now under way. The operation is attracting more than ordinary interest.

Casey Cobalt is Again a Steady Producer.

The production of silver from the Casey Cobalt Mine is going ahead steadily since the rebuilding of the new mill, which replaced the one destroyed in the disastrous bush fires of 1916. The present plant has a battery of 20 stamps, whereas the old mill contained 30 stamps. During the period which the property was without milling facilities, underground work was not carried on very aggressively. Now, however, with the new mill completed and running to capacity, a resumption of the remarkable record established prior to the fire is looked for. The price of silver having advanced greatly since the suspension of operations at the property two years ago, the value of the mine has been enhanced thereby.

Ore Shipments.

During the month of April the ore shipments over the T. & N. O. Ry. were as follows:

Silver Ore.	
Cobalt.	Tons.
Beaver	36.23
Buffalo	296.69
Coniagas	162.05
Dominion Reduction Co.	141.50
Kerr Lake	59.84
Larose	64.36
McKinley-Darragh	149.22
Nipissing	230.19
O'Brien	32.32
Right of Way	41.98
Trethewey	82.32
Total	1,296.70

The Alexo Mining Company shipped 544.60 tons of Nickel ore from Porquois Junction.

The lowest price of silver during the month of April was on the 8th of the month, 91.38 being quoted; while the high for the month was the 25th at 99.75 cents per ounce. Average price for month was 95.345.

Rapid Development of Elliott-Kirkland.

The crosscut at the 500-foot level of the Elliott-Kirkland property at Kirkland Lake has cut the vein. The development of the Elliott-Kirkland is one of the outstanding achievements of the Kirkland Lake Camp. At the time the property was taken under option by the present owners, the latter part of 1916, nothing but surface trenching had been done. The following January sinking was commenced by hand steel and by April of the same year the mining plant had been installed and work was under way on an aggressive scale. Since that time the shaft has been carried to a depth of 500 ft. and upwards of 600 ft. of lateral work has been done. A new hoist, 9 x 12, has just been completed which will be sufficiently powerful to see the mine through its development stage. It is anticipated that a central shaft will be sunk on the property about 700 ft. west south-west from the present working shaft. At this point there is an elevation of land which will probably be chosen as the site for a mill when this becomes necessary. The Elliott-Kirkland is controlled by the interests formerly connected with the rich Seneca Superior Mine at Cobalt, and is under the management of Mr. Robert Lyman, who was also manager of the latter property. A number of the directors visited the property last week and were highly pleased with developments to date.

Good Results at Lake Shore Gold Mine.

In his report to the president and directors of the Lake Shore mine at Kirkland Lake, Mr. R. C. Coffee, manager, stated that the mine produced gold bullion estimated at \$66,696, of which \$24,606 was the March output. The mill treated 1,050 tons in March, and 1,520 tons in April. Since starting on March 8th, the mill has run 97.21 per cent. of the possible running time. Underground developments consisted of drifting and raising on the No. 1 vein and drifting on the 200 and 400 foot levels of the No. 2 vein. A special feature of the report is the fact that from the day the mill was started there has been no loss of time, the mill having run 97.21 per cent. of the possible running time, and a number of the interruptions to operation were caused by failure of the electric transmission line which supplies the camp. A little over 50 tons per day was treated during April, which shows the mill heads to have averaged approximately \$27.70 per ton. The Lake Shore is now the third largest producing gold mine in the Dominion of Canada. In their order of production at present these mines are: Hollinger Consolidated, McIntyre-Porcupine, Lake Shore and Tough-Oakes. In addition to the present record, the property is developing in such a way as to make it necessary to add to the grinding equipment before long, which will thus add from 50 to 100 per cent. to the tonnage treated. The cyanide end of the mill now has a capacity of from 100 to 125 tons per day.

A Second Strike Made at Burnside Mine.

A second important strike of rich ore has been made on the Burnside property at Kirkland Lake within the past two weeks. The first strike was a five-foot vein in a new shaft several hundred feet west of the number two shaft, in which the most recent strike was made. The vein encountered in the first strike is five feet wide and several inches of the vein matter is very rich while the whole five feet is of a good commercial grade. The last strike was made at a depth of 160 feet in a crosscut at the Number two shaft and in the last round of shots some two feet of ore was broken into with the face of the crosscut still in good ore. The Burnside is controlled by the Aladdin-Cobalt Mining Company of Cobalt and the Sylvanite plant is being used for the development of the property.

Kirkland Porphyry.

The downward continuation of the orebody at the Orr Gold Mines at Kirkland Lake, now under option to the Kirkland Porphyry, has been encountered at a depth of 400 feet, and contains ten feet of \$20 ore, with 15 to 20 feet of low grade, the vein being about 30 to 35 feet in width. The ore is said to bear the same characteristics as that encountered on the upper levels. The finding of the vein at this depth on the Orr was almost a foregone conclusion, owing to the fact that it had been developed on the Teck-Hughes to the north-east to a depth of 600 feet and on the Kirkland Lake Gold mines on the west to a depth of 700 feet. It is nevertheless gratifying to prove its existence at another point. The dip of the vein is to the south and for this reason each succeeding level opened upon the Orr is steadily increasing the possible tonnage available. There is also excellent possibilities of the Orr picking up the extension of the south vein system of the neighboring Lake Shore mine, which has a trend in the direction of the Orr.

Mining Molybdenite Near Amos, Que.

Three local mining engineers, Messrs. Balmer Neilly, Lewis Ledyard, and W. E. Simpson, have just returned

from a trip to Lake Keewagama, near Amos, Que., where they visited the molybdenum mines controlled by the Indian Peninsula Mining Company, Limited. Mr. Ledyard has accepted the position of mining engineer at the Indian Peninsula and will have charge of the mining development work, while Mr. W. E. Simpson, one of the directors of the company, will have charge of the metallurgical work. The first car load of supplies for the property is being assembled at Cobalt and will soon be shipped to the property. A 100-ton oil flotation plant of the Groch Centrifugal System is being installed.

Resuming Work at Kirkland Lake Gold Mine.

The work of pumping out the shaft at the Kirkland Lake Gold property, owned by the Beaver Mining Company of Cobalt, is now under way. It is understood mining operations will be commenced in the near future. The mine was shut down a few months ago presumably due to lack of money in the Beaver treasury to meet the expenditure necessary for the successful operation of the property. The Beaver paid \$300,000 for this property and also financed the development of same to a depth of 700 ft., in the course of which \$750,000 in ore was put in sight. Since the suspension of operations at the property the machinery for the new 150-ton mill has been taken in and the work of construction on this plant is proceeding. It is expected the production of gold will commence by the end of the present summer. The new central shaft commenced last fall will be continued to the lower levels of the mine and connected up with the drifts run from the original working shaft.

Alexo Nickel Output.

The production of nickel ore from the Alexo Mine for the month of April exceeded one million pounds. This is the second month during the current year that the output has passed the million pound mark. For the year ended April 30th, 1918, the mine shipped 151 cars containing approximately 12,669,400 pounds, which is at the rate of over one million pounds per month. The ore is shipped to the Mond Nickel Company at Sudbury.

Producing \$75,000 Silver and Gold Per Day.

The silver and gold production of Cobalt, Porcupine and Kirkland Lake at the present time approximate \$75,000 every twenty-four hours. This output is made up of approximately \$50,000 from the mines of Cobalt and \$25,000 from the gold mines of Porcupine and Kirkland Lake.

Oil at Wahnapiatae Crossing.

A discovery of oil has been made on the Canadian Northern Railway about seventy miles northwest of North Bay, near the boundary between the townships of Street and Scadding and within a stone's throw of the crossing of the railway over the Wahnapiatae river. The first claims were recorded the last Wednesday in May. The new find has caused considerable excitement in the district and already a number from here are on their way to the scene of the discovery. A settler first discovered the presence of oil near the railway crossing over a year ago, soon after the occurrence of a seismic disturbance which was plainly felt throughout the north country, including the Cobalt and Sudbury districts. Attracted by the odor of oil the settler investigated and found oil oozing up through the sand. It was recently brought to the attention of men who recognized its possibilities. The geology is not favorable and caution seems advisable.

Schumacher.

Recent operations at the Schumacher mine have been of a sufficiently encouraging nature to lead to the belief

that the operations at this property may be continued despite the trying times. Due to better ore and efficient management profits from the mill have been increased to such an extent that the mine manager, Mr. Harwood, will confer with the directors in Toronto shortly as to the advisability of keeping the mill running. Costs due to suspended development are considerably lower.

Crown Reserve Develops Gowganda Property.

High grade silver ore has been discovered at the 100 ft. level of the Walsh property in the Gowganda district, under option to and being worked by the Crown Reserve Mining Company of Cobalt. As to whether or not the discovery is of special importance cannot be decided until further work has been done. A number of veins have been cut in the crosscut at the 100-ft. level and the one in which the values have been found is said to be from five to eight inches in width. The shaft will be continued to a depth of 200 ft. and further lateral work carried on from this point. The Walsh property is in close proximity to the rich Miller Lake-O'Brien.

Hill Gold Mines.

The new mill at the Hill Gold Mines property in the Painkiller Lake district of the Munro mining field is in the final stages of installation, and would even now be in operation were it not for the fact that delays have occurred in the delivery of certain parts. However, it is expected the mill will be completed and in operation within the next two weeks. The mill is designed for the treatment of about 70 tons per day, but it is the intention of the management to treat only about forty tons for the time being. Several hundred feet of lateral work has been done at the property and the shaft is now being sunk to a depth of 200 ft.

Adanac.

Work in the north crosscut at the 310 ft. level of the Adanac mine was driven a distance of 101 ft. during the month of May. A number of small veins were cut, the last vein being from one to two inches in width and contained considerable cobalt. The veins are dipping a little to the north and it is evident some little distance remains to go yet before encountering the zone of enrichment, which it was expected would have been entered by the first of the current month. The conditions met with underground are highly favorable and the trend of the work is more than ever the centre of interest in the camp. The operating costs during the month were less than \$1,800 and amount to \$17.65 per foot of work done.

Prospecting in Ogden Township.

Considerable activity is apparent in the district four miles south of the Hayden Gold Mines in the township of Ogden. Two gangs of men are working, one on a property north of Gold Lake, and the other south of Gold Lake, where the Moffat claims are being opened up. The work consists chiefly of surface exploration.

SMITH & TRAVERS COMPANY, LIMITED.

The Smith & Travers Diamond Drill Co., Ltd., and the Smith & Durkee Diamond Drilling Co., Ltd., both of Sudbury, have disposed of all their assets to a new company to be known as the Smith & Travers Co., Ltd.

During the month of May 13, Cobalt mining companies shipped an aggregate of 53 car-loads of ore, containing approximately 4,084,150 pounds of ore. Compared with April the May output shows a very marked increase, the figures for the former month being 2,320,661 pounds.

BRITISH COLUMBIA.

The Belmont Gold Mine, Surf Inlet.

One of the most noteworthy mining developments in British Columbia during the past year is that of the Belmont-Surf Inlet Mines, which consist of about nine claims situated about six miles from the head of Surf Inlet in the Skeena Mining Division. This property came into the shipping class last year and, with the installation of a complete plant, is expected to make a very fine showing in 1918. The ore is a pyritized quartz carrying chiefly gold values, with a little silver and copper. The ore is concentrated about 10 to 1 and in the \$125 and \$135 concentrate the gold values run about \$120; silver, 6 oz.; and copper, 2.5 per cent.

The Belmont Canadian Mines, Ltd., developed and bought the property and re-organized into the present company. During the period that the property has been in possession of the new company, Sept. 1, 1917, the net income has been \$86,154. Some unforeseen interruptions for a time kept down the output, which since has been maintained at about 300 tons a day.

In discussing this property Mr. George Clothier, Government Engineer, after describing the plant being installed, says, in part:

"The quartz lies in two well-defined shear-zones in gneissoid granite; the main fracture, in which the main tunnel was driven, splitting into the two about 300 ft. south of the quartz bodies. They occur in lenticular bodies varying in width up to 40 ft., averaging about 10 ft. On the main working level, the 550-ft., the quartz is practically continuous for 800 ft., in which there are developed about 400 ft. of milling ore. This is in the west or hanging-wall zone. From this level a winze has been sunk about the centre of the ore shoot to a depth of 265 ft. on the dip of the vein and 700 ft. of drifting done from the bottom both ways. This was full of water at the time of my visit, but I was informed by the general superintendent that they opened up an exceptionally fine shoot of ore, over 500 ft. in length and averaging about 16 ft. in width."

Mr. Clyde A. Hallett, Philadelphia, is president of the company, and Mr. W. M. Potts, of the same city, vice-president. Mr. J. K. Kitto, Philadelphia, is secretary and treasurer and Mr. B. G. Hawkins, of Vancouver, the assistant secretary.

Standard Silver-Lead.

Reports from Silverton, B.C., indicate that the strike made on the property of the Standard Silver-Lead Mining Company is growing in importance as the development proceeds. The shoot had been followed by drift for 150 ft. some time ago. It since has been proved for an additional length of 200 ft., making the total length 350 ft. The report states that the width of the body varies from 5 to 12 ft. The ore is of a good mining grade. The initial disclosure was on the No. 5 level at a depth of several hundred feet. Ore was followed by winze for 45 ft. It is from the bottom of the winze that development is in progress. In order to permit an ascent by raise from the No. 6 level, development was suspended for a month. The raise is 185 ft. long and has provided ventilation and an economical outlet for ore and waste. There is indecision as to whether the ore undergoing development is a new lens or part of that from which the company removed \$7,000,000 or more in lead-silver-zinc ore. It will add generously to the reserves in any event, but if its independence of the main body is established expectations may be built on resources above and below the horizon of current development. The possibilities overhead are about 700 ft.

Ore-bodies in the Standard have always been erratic in spite of their enormous yields, a fine stope being succeeded often by a short barren section and it in turn by a zone of solid lead. These characteristics have not occurred in any marked degree at the scene of current development. There have been few extremities of impoverishment and riches. Values have been distributed on a basis that approached evenness.

Silversmith Mines, Ltd.

The Silversmith Mines, Ltd., is now the name of the property situated at Sandon, B.C., and previously known as the Slocan Star. A certificate of incorporation has been issued to the Silversmith Mines, Ltd. (non-personal liability) for \$750,000. Some time ago the shareholders decided upon a re-organization and Mr. R. H. Stewart, formerly general manager of the Canadian Consolidated Mining & Smelting Co., has been appointed manager of the new company. It is announced that the mine will commence operations at an early date.

Cork-Province.

The Cork-Province near Kaslo B.C., has added a ball mill and a flotation unit to its concentrator at a cost of \$15,000. The flotation unit will be used for dressing the silver zinc tailings that have been thrown away in the past. The zinc concentrates are shipped to Kansas U.S.A., and the lead goes to the Trail smelter.

St. Keverne.

The St. Keverne group on Payne Mountain in the Slocan will be worked this summer. Oscar White, formerly of the Slocan Star, will be manager.

Cariboo.

Mining men and the public generally in some sections of the British Columbia interior are agitating for some celebration of the 60th anniversary of the discovery of gold in the Cariboo district and the building of the famous Cariboo Road. The movement started at Clinton, B.C., and is being met with favor, it being felt that something should be done to mark and commemorate an event of so much importance and interest as to merit a few pages in Canadian history, particularly in the mining history of Western Canada.

Platinum in B.C.

Owing to the importance of platinum for war purposes and its consequent augmentation in value, the former point being emphasized by the fact that both the United States and Canada have prohibited its export, general interest in the mineral has been roused among British Columbia prospectors. In this connection it has been recalled that platinum occurs, associated with placer gold, in the vicinity of Quesnel Forks, B.C., in the Cariboo district. Mr. John Hobson, when operating the Bullion Hydraulic Gold Mining Co. in that section, recovering a small quantity each year. The discovery of its sources is one of the matters which, it is believed, will be investigated by a party consisting of Messrs. J. B. Tyrrell, the well-known Canadian mineralogist and geologist, representing the Anglo-French Corporation of London; Robert A. Bryce, M.E., representing Porcupine and Cobalt mining interests, and Mr. Gordon Taylor, representing Toronto, Ont., mining interests.

With regard to the matter of platinum in Cariboo, it is interesting to quote Mr. Fleet Robertson, Provincial Mineralogist, in his annual report of the year 1902, when he said: "I found that there were very small quantities of platinum in the Fraser River bars. I traced this up to Quesnel, where the Quesnel river enters the Fraser, above which point I could find but

little in the Fraser river, as it chiefly seemed to be brought in by the Quesnel, which was traced up to Horsefly." He adds that he knows of no platinum occurring in a place in Cariboo, but that British Columbia has platinum also occurring with placer gold in Dease Lake, Cassiar, in considerable quantities and also in the Tulameen District, in which latter district it also has been found in place.

This, however, is not the only object of the visit of the party referred to, it being understood that they will inspect several propositions in the Cariboo District with a view to their development.

Convention at Revelstoke.

The international mining convention of the Pacific Northwest will be held in July of this year at Revelstoke, B.C. The convention is to be held in the open air, the scene being a beautiful park situated a short distance outside the town. If weather permits, the banquet, which is a feature of the assembly, will take place on the same grounds, the menu being wholesome, but strictly within the limits of the Canadian Food Board and cooked over open fires in typical prospector fashion. It will be attended by representatives of the mining Provinces and States of the Northwest.

Will Develop Fiddler Claims.

At least \$150,000 will be spent on the development of the Fiddler group of mineral claims situated near Dorreen, B.C., in the Skeena Mining Division, Northern British Columbia, a considerable proportion of which will be expended this year. It is understood that the Oppenheimer interests of Butte, Mont., are advancing the capital for this purpose and it is confidently expected that the property will be placed on the shipping list soon. It is situated in the neighborhood of the Rocher de Boule. The ore contents are chiefly gold.

Exhibits of Rare Minerals.

For the further encouragement and instruction of the prospectors of British Columbia, and also in order to induce the location and development of the rarer minerals in the Province, Hon. Wm. Sloan, Minister of Mines, has authorized the Mining Engineers of the Department of Mines to secure complete exhibits of these rarer metals and arrange for their display in the centres of the six mineral survey districts into which British Columbia has been divided. It is the Minister's opinion that one of the reasons that comparatively little is known of the resources of Western Canada in respect of the rare minerals, the usefulness and value of which have been emphasized by the demands of the war, is that the prospectors are not fully conversant with their characteristics. Therefore he believes that with specimens on public exhibit, and engineers competent to give visitors the knowledge which, perhaps, they lack, it will be found that the Province possesses mineral riches which, up to the present, have not been brought to light. The first of these exhibitions has been opened by Mr. R. W. Thomson, M.E., at Kamloops, B.C., There will be others at Nanaimo, Prince Rupert, Hazelton, Revelstoke, and Grand Forks.

Will Use Powdered Coal.

The use of powdered coal to replace fuel oil is the subject of experiment in British Columbia at the present time. In Vancouver City the B.C. Sugar Refining Co., one of the largest of the Provincial industries, has installed a plant to provide for the change and, it is understood, is getting satisfactory results. The Canadian Collieries (Dunsmuir) Ltd., anticipating a demand for the new fuel, is making tests of waste from its washery which has been accumulating for years in the harbor

at Ladysmith, B.C. If the results prove what is expected the Company will install special equipment for pulverizing and will proceed with the reclaiming of this coal refuse, of which there must be four or five million tons and some of which has been lying under water for seventeen years. It is considered probable that, should the experiments now under way turn out right, and providing the United States withdraws the "tankers" at present in service between California and British Columbia, the Canadian Pacific Railway Co. will arrange for the use of coal dust in locomotives now burning oil.

An interesting side-light on the increased value of coal in the Canadian Northwest is obtained from an experience of the Pacific Coast Coal Mines Co. In pre-war days the company discharged its waste into a lagoon, across which a rough cofferdam had been constructed. Mr. George Wilkinson, then manager of the company's operations and now Inspector of Mines for British Columbia, was responsible for this and his idea was that this coal, for which there then was no market, might prove useful in an emergency. Last year some 50,000 tons of it were recovered and placed on the market at \$3 a ton.

Canadian Western Fuel Co.

A new company, known as the Canadian Western Fuel Company, has been incorporated in British Columbia for the purpose of purchasing, taking over and operating all the assets in British Columbia of the old Western Fuel Company, of San Francisco, Cal. The incorporators of the new company are Messrs. G. W. B. Owen, J. B. Owen and John Hunt, and the capital is \$5,000,000. There will be no change in the management of the company as at present constituted and its headquarters will be at Nanaimo, B.C. Mr. G. W. B. Owen is the general manager and Mr. John Hunt remains the general superintendent. Mr. J. B. Owen is the manager of the Western Mercantile Company, the trading establishment opened by the Western Fuel Company when it was reorganized a year ago.

The purchase of the Vancouver Island properties of the Nanoose Collieries, Ltd., by the Nanoose Wellington Coal Company, has been announced. Mr. Lewis Williams, president of the purchasing company, has given a statement to the effect that it is the intention to push the development of the coal bearing areas controlled by the new concern to the end that the present output may be trebled.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 17 cents per lb.

June 11, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10 cents per lb.

Lead, 9½ cents per lb.

Antimony, 16 cents per lb.

Copper, casting, 28 cents per lb.

Electrolytic, 28½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

June 11, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York	London
	cents.	pence.
May—		
25	99½	48¾
27	99½	48¾
28	99½	48¾
29	99½	48¾
31	99½	48¾
June—		
1	99½	48¾
3	99½	48¾
4	99½	48¾
5	99½	48¾
6	99½	48¾
7	99½	48¾

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange at the close of business, June 9, 1918.)

Gold.		
	Bid	Ask
Apex .....	.03	.04
Dome Extension .....	.10½	.11½
Dome Lake .....	..	.15
Dome Mines	7.50	..
Hollinger	4.87	4.90
Imperial .....	.01	.01½
McIntyre	1.25	1.26
New Ray .....	.20¼	.20½
Porcupine Crown .....	.13½	.15
Vipond .....	.10	..
Preston East Dome .....	.02¾	.03
Teck-Hughes .....	.40	.45
West Dome .....	.08½	.08¾

Silver.		
	Bid	Ask
Adanac .....	.08	.09½
Bailey .....	.03½	.04
Buffalo .....	..	1.05
Beaver .....	.23¾	.25
Chambers Ferland .....	.11½	.12¼
Coniagas	2.75	..
Crown Reserve .....	.18	..
Gifford .....	.02½	.02¾
Great Northern .....	.03	.03¾
Hargraves .....	.07¼	.07½
Hudson Bay .....	..	34.00
Kerr Lake	5.65	5.90
Larose .....	.40	.41
McKinley .....	.39	.42
Nipissing	8.90	9.00
Peterson Lake .....	.09½	.10
Right of Way .....	..	.03¾
Seneca Superior .....	..	.02
Silver Leaf .....	..	.01¼
Temiskaming .....	.28	.28¼
Wettlaufer .....	.04	..
Mining Corporation .....	..	3.40

NEW YORK MARKETS.

June 7, 1918.

Aluminum—Government price, carload lots, f.o.b. plant, effective June 1st:
98-99% Virgin, 33.10.
98-99% remelt, 33.10.
No. 12 Aluminum Co., 33.30.

No. 12 remelt, 33.30.
 Scrap aluminum, 33.10.
 Powdered aluminum, 65.00 to 70.00.
 Metallic Magnesium—99% plus, 1.75 to 2.00.
 Nickel—Ingot, 40.00.
 Shot, 43.00.
 Bismuth, nominal, 3.50.
 Cadmium, nominal, 1.40 to 1.50.
 Palladium, \$135.
 Quicksilver, nominal, \$118 to \$120.
 Platinum (pure), \$105.00.
 Iridium, \$175.
 Cobalt (metallic), 2.50 to 3.50.
 Tungsten—
 Scheelite, 22.00 to 24.00.
 Wolframite, 20.00 to 24.00.
 Gravel, Fluorspar: f.o.b. mines—Prompt, \$30.00.
 Contract, year 1918, 25.00 to 28.00.
 Silver (official), 99½.

Metal Products.—The following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices:
 Hot roller, 32.50 to 34.00.
 Cold rolled, 32.50 to 35.00.
 Copper bottoms, 40.50 to 42.00.
 (Shipments from stock 2c per lb. extra).

Copper rods—Base prices.
 Round, 32.50.
 Sq. and rectangular, 33.50.

Copper wire—Base prices.
 Nominal, 26.25.

Brass Products—Base prices.
High brass—
 Sheets and wire, 26.75 to 27.50.
 Rods, 24.75 to 26.75.

Low brass—
 Sheets and wire, 30.00 to 32.00.
 Rods, 30.75 to 32.75.

Brazed tubing—
 Brass, 34.75 to 36.75.
 Bronze, 39.75 to 41.75.

Seamless tubing—Base prices.
 Brass, 35.50 to 37.50.
 Copper, 38.00 to 40.00.
 Bronze, 42.50 to 43.50.

Full lead sheets, 9.25.
 Cut lead sheets, 9.50.
 Sheet zinc, f.o.b. smelter, 15.00.

AUCTION SALE of Valuable Graphite Property

Near Buckingham, Province of Quebec, Canada.

The undersigned will offer for sale by public auction at W. A. Cole's Auction Rooms, No. 63 Sparks Street, in the City of Ottawa, Canada, at 2.30 o'clock in the afternoon of the tenth day of September, 1918, the property known as the "Walker Graphite Mine," in the Township of Buckingham, comprising about 1250 acres of land, held in fee simple. The property is situated about six miles from the town of Buckingham, on the Canadian Pacific Railway, between Montreal and Ottawa, and less than ten miles from the landing on the Ottawa River. The quantity of ore is practically inexhaustible, and the mining facilities are exceptional.

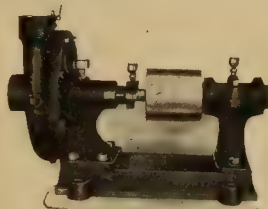
The buildings consist of refinery, engine and boiler house, manager's dwelling, foreman's dwelling, and other buildings. The lands are well timbered and contain ample supplies for mine purposes and fuel. The right to cut basswood until the 1st day of March, 1919, has been sold.

A large quantity of machinery, plant and tools on the property will also be sold as a separate lot. Both sales will be subject to reserved bids.

Applications to inspect the property may be made to Mr. Sam. Devine, Buckingham, Quebec, Canada, and further particulars may be obtained from

M. J. GORMAN, Vendor's Solicitor,
 Union Bank Building,
 Ottawa, Canada.

W. A. COLE, Auctioneer



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MINE CAGES, with safety devices, made to order, to fit the customer's shaft.

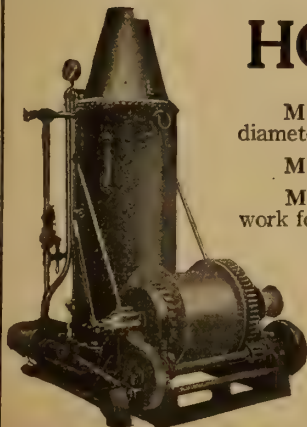
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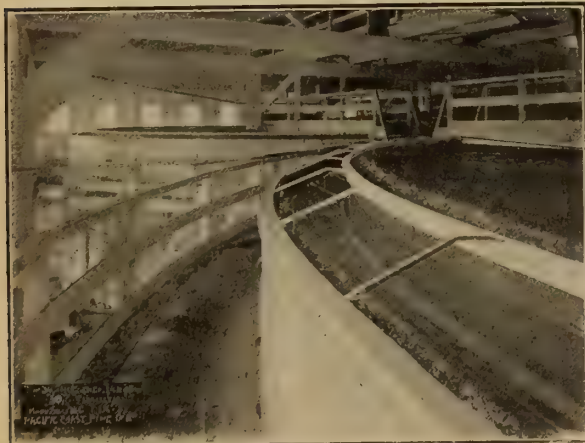
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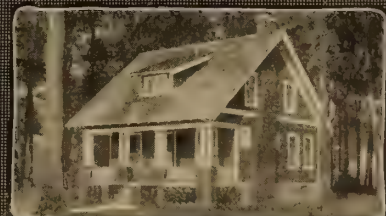
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R. G. McCONNELL, Deputy Minister.

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Recent Publications

Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.

Feldspar in Canada. Report on, by H. S. de Schmid, M.E.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.

Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.

Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown.

The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke.

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 102. Espanola district, Ontario, by Terence T. Quirke.

Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.

Map 167A. East Sooke, Vancouver Island. Geology.

Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.

Map 1662. Ottawa, Carleton and Ottawa counties.

Map 1665. Stone available for road material, Hull to Grenville, Quebec.

Map 1667. Slocan Mining Area, Kootenay District, B.C.

Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been is-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

(Signed) J. M. Callow.



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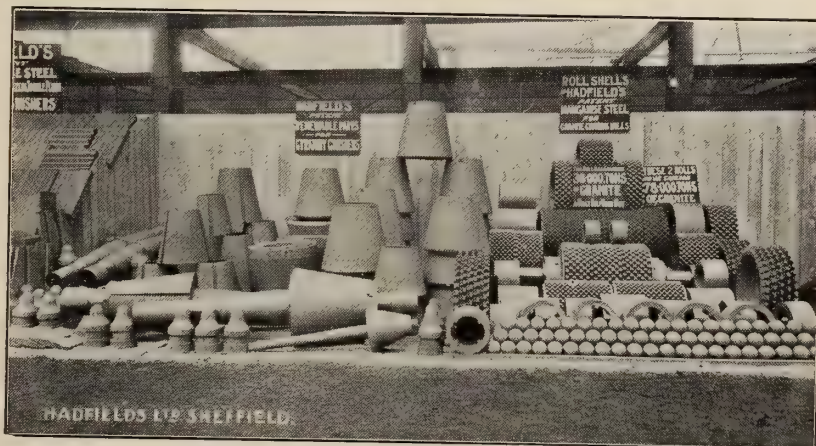
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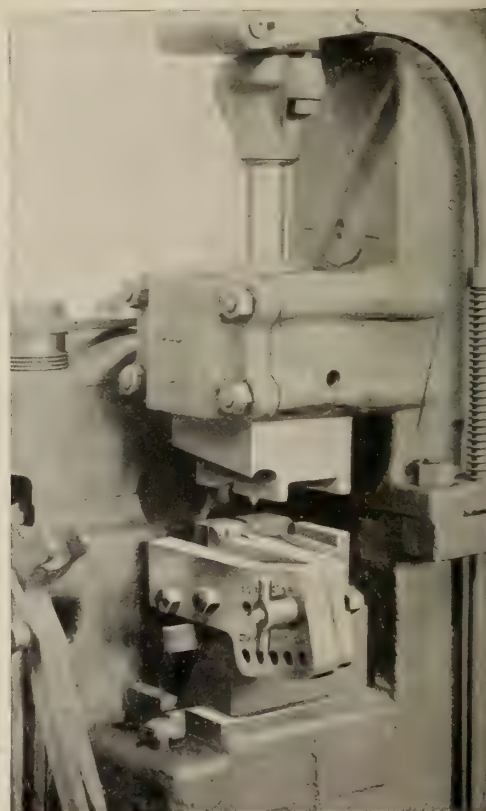
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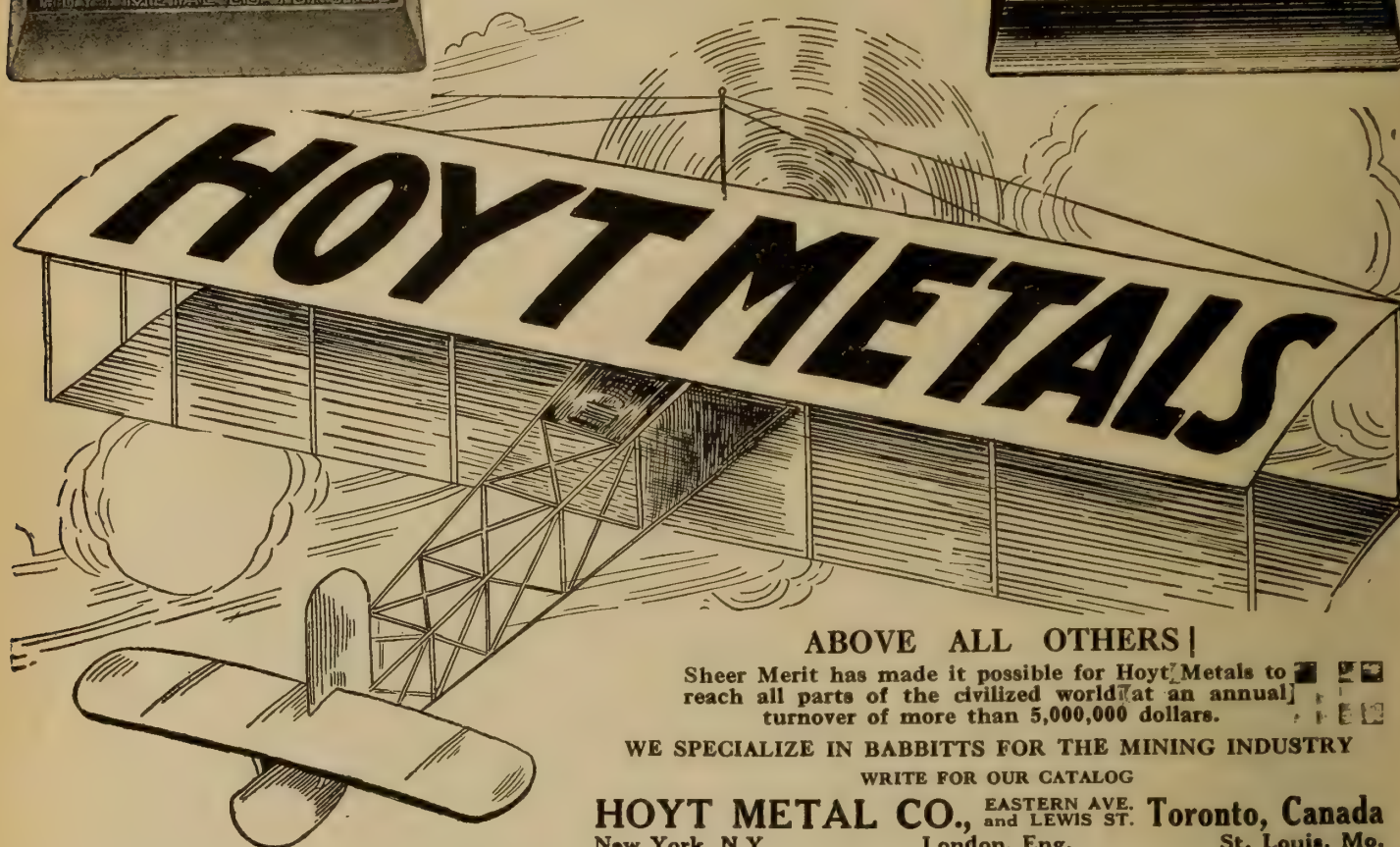
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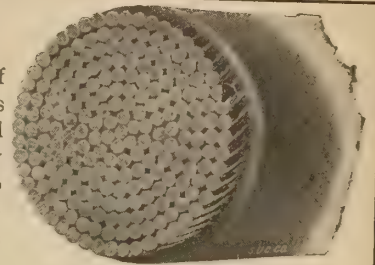
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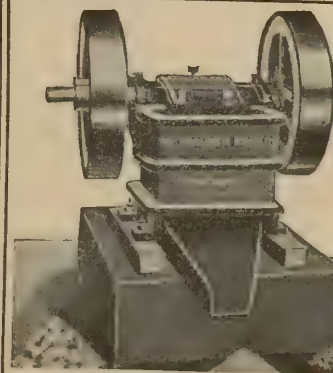
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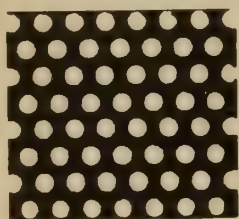
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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

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MINES BRANCH

Department of Colonization, Mines and Fisheries

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent, on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

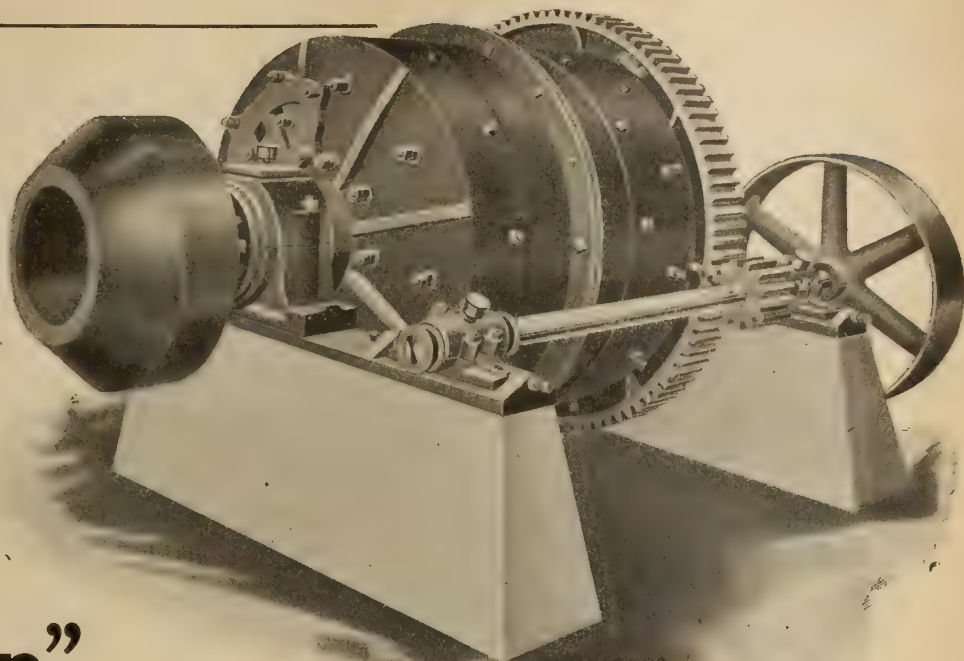
Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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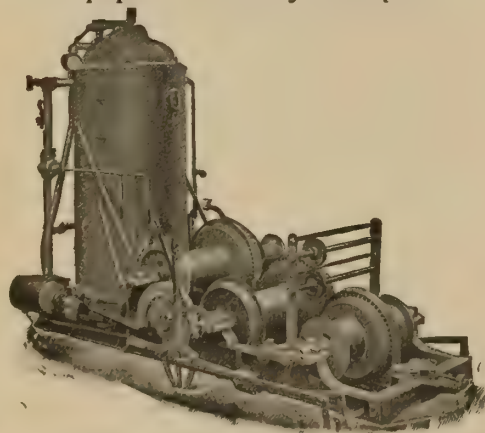
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, July 1st, 1918.

No. 13

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the
MINES PUBLISHING CO., LIMITED

Head Office 263-5 Adelaide Street, West, Toronto
Branch Office 600 Read Bldg., Montreal

Editor: REGINALD E. HORE, B.A. (Toronto).

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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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KEEP THE COAL CLEAN.

The Fuel Administration of the United States in enforcing its instructions regarding the proper preparation of coal. Six coal mines have been shut down for disregarding the clean coal regulations. Operators of many mines have been censured and warned to improve their methods. Good results are being obtained as a result of the regulations.

As the value of fuel is greatly depreciated by careless preparation, an increase in tonnage produced is worse than useless, if the increase is obtained by a corresponding increase in the percentage of waste in the coal shipped. "Keep the coal clean," should be the slogan of operators and miners alike.

Decrease in anthracite output in the United States in May was confined to grades used for domestic purposes, production of steam coal from culm banks having increased. Shortage of labor is said to be responsible for the decrease in freshly mined coal, inroads being made on labor by munition plants and other war indus-

BETTER WAGES AND MORE WORK.

Better wages and more work, seems to be the solution of the labor problem. There is no doubt that most miners could do more work per day if they wished to and if they considered that they were getting a fair share of the profits derived from their labor. At present high wages are being paid; but there seems to be good reason to doubt whether it will be possible to continue without serious readjustment after the war. It would be very unfortunate if it should be found necessary to lower the wages and it is well to look to other means for keeping down the cost of production.

The mineral resources of Canada will be more rapidly developed if we can make mining more profitable to all who are engaged in it. It is not enough that a few companies should be very successful. Every man who works in or about a mine or metallurgical plant should have an opportunity to earn a decent living and to acquire a reasonable portion of the things that will make him and his family happy and will enable his children to obtain a good education. He should be recognized as a very useful citizen who is contributing directly to the wealth of the nation by his labor. His living conditions should not be only satisfactory to himself, but such as to attract young men from other occupations. We believe that this would be possible to a very great degree if by mutual understanding it was agreed that he would exert himself to do more work. If miners could be induced to work reasonably hard for eight hours a day, they could very well be paid better wages than have been possible in the past.

With regard to this, Mr. Wm. Frecheville says: "With regard to cost (of production), the efficiency of labor plays a very important part. Probably most metal mine managers would agree with the view that their workmen could, without hurting themselves, accomplish more than they do. There is a general feeling that the men, even when working on contract, do not let themselves go to the extent that they might, the explanation being that they often fear that if they do more, and in consequence make a good thing out of their contract, the price would be cut or reduced for the next monthly contract, with the result that they would have to work harder for the same wage. There is the further fact that the present system does not seem to bring out any community of interest between the men and the mine, and we all know how better results can, as a rule, be got by anyone who is interested in the result and works with his head as well as with his hands. These difficulties exist no doubt in other industries, and in some perhaps to a greater extent than in the metal mining industry, and they probably constitute the principal industrial problem awaiting solution in the after-war days, when we hope many of the difficulties and

hand are the men holding back, and on the other side increased working costs, and opportunities of production are not being utilized to the full. To the writer it seems that probably the key to the situation lies in the fact that the men who do the work are not, perhaps, obtaining their fair share of the wealth they produce and of the good things that are going. Starting from that proposition it should not be beyond the bounds of human ingenuity to devise some way by which, in conceding higher wages, more strenuous and intelligent labor should be obtained."

Greater effort on the part of the miner is fortunately not the only way in which costs can be reduced; but unless the worker is willing and industrious, attempts to increase efficiency are sometimes disheartening. It is not uncommon for managers to encounter opposition when they introduce improved methods and machinery which would allow the miner to get more work done without increased effort. It would be well if the workmen could be made to understand that their co-operation in increasing efficiency makes it possible for their employers to pay better wages. One of the easiest ways to make them understand this is to promptly reward those who earn more. There is sometimes difficulty in doing this, but where it is possible, as is the case under the contract system, it is very illuminating.

It is not enough, however, that the miner should be induced to use improved methods and machines. He should be made to see that it is to his advantage to devise improvements himself. He should understand that while inefficiency on his part helps to keep down the wages of both himself and his fellow workers, the industrious and intelligent worker is helping to increase wages as well as the profits of those who have supplied the capital which makes it possible to carry on the work.

DEVELOPMENT OF THE MINERAL RESOURCES OF THE EMPIRE.

At a meeting of the Royal Society of Arts, held in London, in February, Wm. Frecheville read a paper on the development of the mineral resources of the British Empire. Mr. Frecheville is a distinguished mining engineer and copies of his paper which have recently reached Canada will be read with great interest here. Lines of action which would aid development are clearly pointed out in his paper. Metals for construction and money to pay our debts will be needed in very great quantities after the war and it is incumbent on us to provide for the more vigorous development of our natural resources.

"Looking at the Empire as a vast estate, large parts of which still await exploration and development, the first and obvious step would be to find out what we have. While encouraging exploration and prospecting by others, it is suggested that the estate owner should himself take some active steps in the matter, and by means of the examination of the country by skilled

coveries, the most likely ground for prospecting and generally the wisest policy to pursue to encourage the mining industry for the good of the community. In our Crown Colonies this should be done under the control of the Home Government. In other parts of the overseas Empire, the Governments of the great Dominions already give much attention to the development of their mineral resources; but the territories they administer are so huge there is ample scope for doing more if the means were available."

With regard to the great scope for expansion of the mining industry in Canada Mr. Frecheville says: "The mining centres are scattered through the known and prospected belt of country stretching from east to west, and the fact that they are absent on the little known and unprospected great northern country is in all probability not due to the non-existence of mineral deposits, but to their not having been found."

Referring to the difficulty of finding money in Canada to finance mining enterprises, Mr. Frecheville said that a very large copper deposit had recently been found in Manitoba, which had been proved to contain six or eight million tons of ore of a low grade, but which could be profitably worked on the huge scale on which Americans work their copper mines. \$5,000,000 is required to work this mine; \$2,500,000 for a railway and \$2,500,000 for a plant; but Canadians cannot provide the money. The Government was being asked to do a good deal and if they rose to the occasion they might do it. The South African Government is now offering mining areas on the Far Eastern Rand to tender, the Government taking a share of the profits on a sliding scale. Mr. Frecheville suggested that other parts of the Empire might well adopt the system.

GOLD IS NEEDED.

Since the selling price of gold remains fixed and the cost of mining and treating the ore has naturally risen during the war, it must be obvious that the present is not the most profitable time to mine gold. Anyone who imagines otherwise should consult the recent records of gold mining companies.

Since gold is not directly used in the manufacture of munitions, it is not surprising that a considerable portion of the public may be of the opinion that the war could be carried on just as well if the gold mines were closed down, and the miners employed on work that is commonly recognized as essential. As was pointed out by Mr. Hennen Jennings in an article recently published in the "Journal," the production of gold is necessary and every effort should be made to encourage it. With the public indifferent, we must depend upon the leading ability of governments. It is of interest to note that at least one leader in the United States government has strong views on the advisability of encouraging gold production. A Boston newspaper quotes Secretary McAdoo as saying:

"I fully appreciate that with rising cost of raw material and labor, and with a fixed value for their out-

ties. I should be sorry, however, if for this reason there were any relaxation in the effort to produce gold. At no time has this country so much required the largest possible production of gold as at the present. Next to food and ammunition, gold is one of the most needed war essentials. The man or the community that maintains or increases the production of gold in the face of difficulty and discouragement is performing a patriotic service no less than the more obvious, but not more useful, services that are more in the public eye."

THE COAL SITUATION IN WESTERN CANADA.

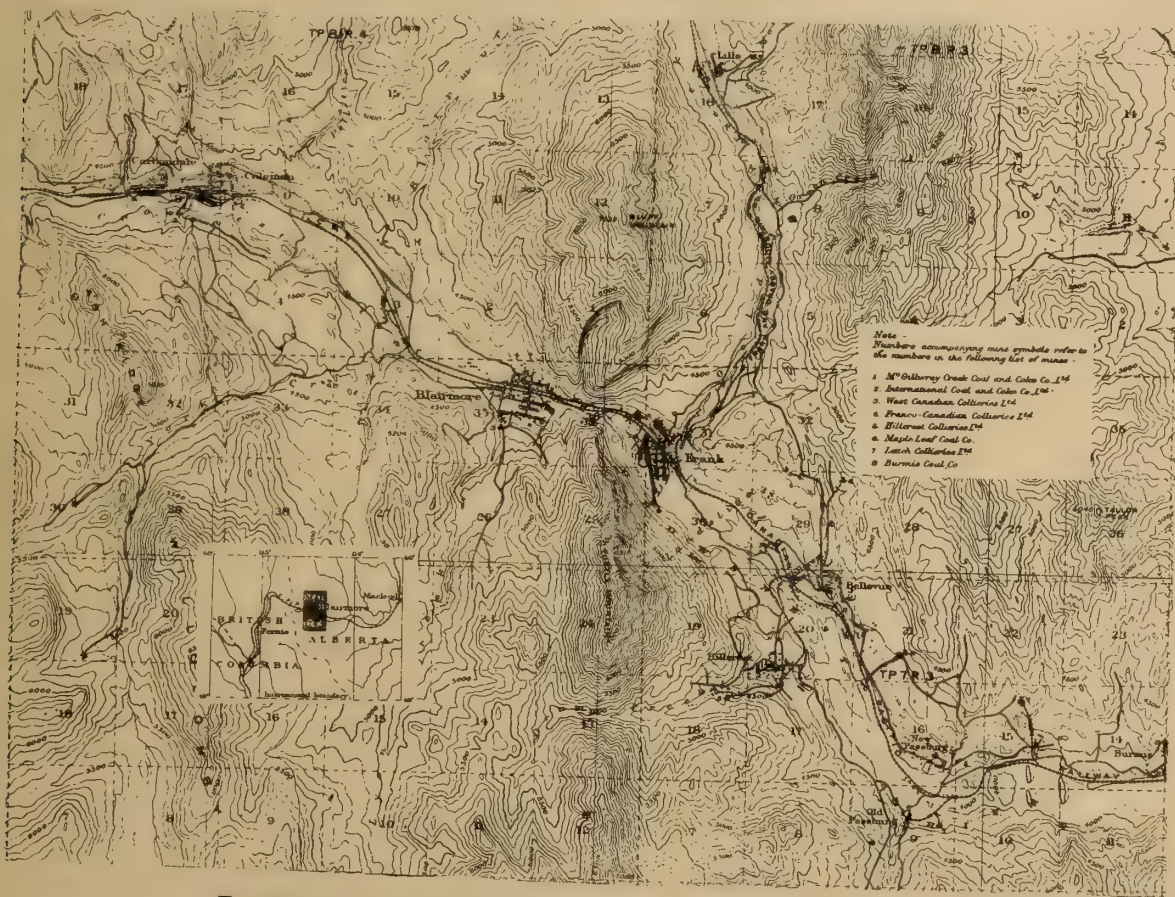
Mr. Grant Hall, vice-president of the Canadian Pacific Railway Co., has issued the following statement in regard to the coal situation in Western Canada:

"The fuel controllers say that the prospects for a supply of anthracite coal is no different from a few

tiful; when there was no abnormal demand for it for extraordinary uses; when there was no doubt of the supply from the United States. Now all precedents have been wiped out and I think the people owe it to themselves to seriously consider the situation and get in their supply, thus relieving the tension on railways and mine owners, but most of all on themselves."

THE BLAIRMORE COAL AREA, ALBERTA.

Alberta possesses by far the most extensive coal areas of any province of Canada—in fact, the greater part of the south-eastern section of the province seems to be underlain by coal. D. B. Dowling has estimated the known and mineable coal areas at not less than 30,000 square miles. On the eastern slopes of the Rocky Mountains the coals vary in character from bituminous coking and non-coking coals to anthracite. There is comparatively little anthracite; but much good bituminous coal.



The Blairmore Coal Area, Crownsnest District, Western Alberta

months ago and with this in view it seems to me imperative that consumers of coal should heed the warning. Speaking strictly from a railway point of view I would like to remind the people that prospects are very good, taking the time of year into consideration, for a good crop and you know how important it is that the crop be moved on time. Even a normal grain crop takes all the men and equipment that can be mustered when men are plentiful and with the scarcity that now exists it can easily be computed how impossible it will be to move both grain and coal in the same direction and give satisfaction to both.

"There have been times in the past when this company has helped out the domestic coal situation in the West by allowing dealers and others in time of severe weather to use from our stocks on hand, but I would like to remind all concerned that such action was in the days when coal was what one might well call a

The Geological Survey, Ottawa, has just published a topographical map of the Blairmore area. We reproduce part of it on this page on a much reduced scale. The location of the area near the Alberta-British Columbia boundary is shown on the small inserted map at the left.

This area is part of the Crownsnest Pass coal area, part of which is in British Columbia. It is generally referred to as the Crownsnest Pass District, Alberta. The mines operating here produced during 1917, 1,193,313 tons of coal. Mr. John Stirling, chief inspector of mines of Alberta, says that if these mines had been in operation fairly steadily, without increasing the present amount of development or men employed, the output might have been 1,779,888. If Western Canada needs coal, this area can supply much larger quantities than the

Copper Mining and Refining in British Columbia

By E. JACOBS.

It will be remembered that about three years ago there was appointed by the Minister of Militia and Defence "a Commission to Investigate the Feasibility of Refining Copper and Producing Metallic Zinc on a Commercial Scale in the Dominion of Canada." The members of that commission were: Hon. Lt.-Col. David Carnegie, M. Inst., C.E., Chairman, Ordnance Advisor to Shell Committee; Dr. Alfred W. G. Wilson, Chief of Metal Division, Mines Branch of Canada Department of Mines, Ottawa, and Dr. A. Stansfield, Professor of Metallurgy, McGill University, Montreal. The Commission was formed after several conferences, concerning the supply of copper and zinc for the British War Office contracts, with the Minister of Militia and Defence, General Hughes; the Chairman of the Shell Committee, Brig.-General Bertram; Mr. David Carnegie, Ordnance Advisor, and finally with Sir Robert Borden, the Prime Minister. The investigations of the commission covered a period from March to August, 1915. In 1916 the Imperial Munitions Board, Ottawa, with the approval of the Minister of Militia and Defence, authorized the publication of the report which was the outcome of the investigations of the commission and which, as stated by its chairman, included "information of value to many in the Dominion, as it contained the mature opinions of the most expert men in Canada on the subjects dealt with."

It is thought probable that, leaving out for the present the subject of the production of metallic zinc, which, by the way was successfully established at Trail, B.C., on a commercial scale before that of refined copper was also undertaken there, a general review of the situation in regard to the production of copper in British Columbia, keeping in mind the opinions expressed during the time the investigations were made, will be of interest. No reference will be made to the production of copper in Ontario, though this is of important and increasingly large proportions, for the reason that in its preliminary conclusions the commission, after having expressed its opinion that the time was opportune to commence refining copper in Canada, favored Trail, B.C., as "the best location where to begin." It may be well to quote from the report of the commission its preliminary conclusions, as under:

"Preliminary Conclusions Regarding the Refining of Copper in Canada.

"(1) We are of opinion that the time is opportune to commence refining copper in Canada.

"(2) The best location where to begin refining copper is, in our opinion, at the works of the Consolidated Mining and Smelting Company of Canada, Trail, B.C., because:

"(a) The works are owned and operated by Canadian capital.

"(b) The company is free to commence refining copper immediately, as it has no binding contracts with companies in the United States, such as exist for at least two years between the copper producers at the coast and the refineries in the United States.

"(c) The companies at the coast are all controlled by firms in the United States.

"(d) The Consolidated Mining and Smelting Company of Canada now possesses an efficient staff

"(e) As the electrolytic refining of lead has been carried on successfully at Trail for some years past the company is in a more favorable position to produce electrolytic copper more economically and at less initial cost of plant than any of the companies on the coast.

"(f) The establishment of a refinery at Trail would in no way interfere with the subsequent establishment of a refinery at the coast, should this be found advisable.

"Advantages of Refining Copper in Canada:

"(1) The establishment of a copper refinery in Canada means the beginning of a new industry, which will lead to the manufacture of copper products now imported from the United States and elsewhere, such as wire, bars, sheets, tubes, etc.

"(2) It means that the money value of the labor now enjoyed by the United States, in manufacturing the imported products, could be kept within the Dominion. The value of the imported products is upward of \$5,000,000 annually. This amount does not include the value of brass imported.

"(3) It means that as approximately one-third of the value of the copper produced in the Dominion now goes to the United States to pay the cost of refining, freight, and marketing, that amount would be saved to the Dominion.

"Note.—It costs from 8c to 11c per lb. to produce the finished product—ingot copper ready for the manufacturers—from copper ore in the mine. The market price of copper usually varies from 12c per lb. upward.)

"Copper Available.—Dr. Wilson estimates that there is more than 1,000,000,000 lb. of copper available in the known ore deposits of British Columbia, most of which will be mined in all probability during the next 15 years. The undeveloped resources cannot be estimated.

"Total Copper Mined Annually.—The total copper mined and partially manufactured in Canada is about 75,000,000 lb. annually. This will be increased probably to 100,000,000 lbs. within two years.

"The total copper mined and partially manufactured in British Columbia is about 45,000,000 lbs. annually. This, too, will be increased within the next two years."

It is of interest to note that Dr. Wilson's prediction as to an increase in the production of copper has been amply realized. The output of copper in the Dominion and British Columbia, respectively, during the last three years is shown in the following table:

Year.	Whole of Canada.		British Columbia.	
	Lb.		Lb.	
1915	100,785,150		56,692,988	
1916	117,150,028		63,642,550	
1917 (estimated)	108,860,358		57,717,535	

(Note.—The foregoing figures are those of the Dominion Statistician, who obtains actual production of metallic copper.)

British Columbia Copper Producers.

The larger producers of copper from mines in British Columbia are the Granby Consolidated Mining, Smelting & Power Co., Ltd., operating in both the Boundary and Coast districts; the Britannia Mining and Smelting Co., Ltd., in the Coast district; the Canada Copper Corporation, Ltd., (formerly the British Columbia Copper

Co., Ltd.), in Boundary district, and the Consolidated Mining and Smelting Company of Canada, Ltd., in Rossland camp, Trail mining division. For a number of years the Boundary district produced more copper than any other in Canada, but in quite recent years its output has fallen off considerably while that of the Coast district of British Columbia has increased until now the latter is a long way in the lead in the province, with every indication of making further increase, while the Boundary district is showing a steadily diminishing production. In fact there does not seem to be a reasonable prospect of any early large increase in the production from interior district mines, not at any rate until the Canada Copper Corporation shall be making a considerable output of ore from its big mine on Copper Mountain, in Similkameen district, which may not be before the close of next year.

Three Principal Producing Districts.

Reverting to the report of the commission, Dr. Wilson's "Report on the Possibility of Producing Refined Copper in Canada," dealt first with the copper resources of the Dominion, and in this connection he mentioned three principal producing districts, namely (a) Kootenays, (b) Boundary, and (c) Coast. The situation to-day is different, in that the output of copper from mines in Kootenay and Boundary districts may be expected to be smaller in 1918 than in any year since it attained to considerable proportions in these districts. The chief reasons for this are that the Consolidated Company has quite lately very much reduced, if not entirely discontinued for the time being, production of ore at its mines in Rossland camp, in West Kootenay, while in Boundary district the smelting works of the Granby Co. and the Canada Copper Corporation, respectively, are not operating at full capacity, nor does the ore these companies are now mining contain as high an average of copper as that of a few years ago from the same mines. With only one company in Rossland camp now maintaining its normal production, namely, the Le Roi No. 2, Ltd., operating the Josie group of mines, from which an output of between 500,000 and 700,000 lb. of copper may be expected this year, with little copper ore being mined in Nelson mining division this year; with decreased tonnage and a smaller copper content in ore from Boundary mines, and with the Iron Mask, near Kamloops, being the only other mine worth mentioning among the smaller producers of copper in the interior districts, it seems evident that there must be expected a serious falling off in the output of copper from these districts this year.

As to the Coast district—there does not appear to be good reason to look for any appreciably large increase in output except the Granby Company shall make it. The Britannia Company is reported to have decided not to continue the policy of considerable expansion of operations planned earlier. So far as known, there is little promise of much production from smaller mines, neither in Howe Sound region nor on Texada and Vancouver Islands. Progress is reported from two mines in Sooke district, Vancouver Island, but their output cannot be large until much more ore shall have been developed. In Quatsino division of Vancouver Island, the Coast Copper Co., controlled by the Consolidated Mining and Smelting Co., has done much development work, but until a railway shall have been constructed to provide transportation facilities and arrangements made for reduction of the ore, no production of copper can be expected from that source. Neither is there assurance of much improvement soon

as regards copper mining properties on Moresby Island of the Queen Charlotte group, nor of any other part of the upper Coast district, except it be in the district about Observatory inlet outside of the parts controlled by the Granby Co. In Omineca division, in camps within reach of the Grand Trunk Pacific railway, there are copper properties, but the only one yet sufficiently developed to make a production of more than an occasional small shipment is the Rocher de Boule Copper Co.'s mine, which has already attained to a production of between 1,000,000 and 2,000,000 lb. of copper in a year.

More Specific Information.

The general situation to-day in regard to the production of copper in British Columbia having been outlined it may be desirable that more specific information be given in regard to the chief producing districts.

Kootenay.—Dr. Wilson stated in his report, concerning the Kootenays, that in 1914 Rossland made a production of 3,779,830 lb. of copper and Nelson 586,764 lb., together 4,366,594 lb. He added: "These are both tributary to the smeltery of the Consolidated Mining and Smelting Company of Canada (C.P.R.) at Trail. The Rossland ores are essentially gold ores; they, however, contain a small amount of copper in the form of a sulphide, not much more than one-half of one per cent., but sufficient to make it feasible to recover the gold by the methods of the copper smelter."

On May 3 "The Trail News" published the following: "One of the contributing causes of heavily curtailing gold-copper ore shipments from Rossland mines yesterday was the heavy mine taxes imposed by the Provincial Government. This, together with the heavy increase in cost of powder and everything else pertaining to mining—and the further fact that Rossland ores contain but a few pounds of copper to the ton, being most in gold value, is understood to have impelled the Consolidated Co. to lay off most of the miners employed in its Rossland mines. A few will be kept at development, and some shipments of ore will possibly be made—enough, perhaps, to keep one copper furnace at the company's smeltery at Trail in operation, together with the shipments of high-grade copper ore that are being received here from various custom sources, thus also keeping the copper refinery in operation. . . . At the Trail smeltery, all the copper furnaces but one have been blown out." The notice issued at Rossland by the Consolidated Co. reads as follows: "Large increases in the various items entering into the mining and smelting of Rossland ores, such as wages, cost of explosives, coke, steel, general mine and smeltery supplies, without adequate compensation in value by way of increased metal prices, coupled with increased taxation, has made it necessary for the company to suspend shipments from its Rossland mines indefinitely. An endeavor will be made to keep a small force on development work, and to place the remainder of the company's Rossland employees at the smeltery, the Sullivan mine, Kimberley, and other lead-silver properties of the company." It will thus be seen that the production of copper in the Kootenay districts is likely to be very small this year, with only one of the five copper blast furnaces at Trail being operated.

Boundary.—As to the Boundary district—in the Mines Handbook for 1918, it is stated concerning Granby Co.'s mines, that "Ore now being mined at Phoenix yields slightly less than 15 lb. copper and about 84c gold and silver per ton. . . . On the Gold Drop only 80,000 tons of ore remains to be extracted, and the Snowshoe, Curlew, and Monarch claims are almost worked out.

Practically all reserve tonnage is in the Ironsides." District newspaper statements are to the effect that only four of the eight blast furnaces at Grand Forks are being regularly operated. Ore reserves in the Granby mines in Phoenix camp were estimated to be about 3,576,000 tons as at June 30, 1917. Total blast-furnace capacity at the Granby smelter at Grand Forks is stated to be 1,440,000 tons of ore per annum. There are three electrically-operated converter stands with ten 84 x 126 in. shells of barrel type; product is blister copper of 98.5 per cent. tenor, containing an average of 18 oz. silver and 4 oz. gold per ton.

The decreasing production of the British Columbia Copper Co., now the Canada Copper Corporation, is indicated by the following yearly output figures: In 1912, 11,146,811 lb. copper; in 1913, 8,296,902 lb.; 1914 and 1915 were broken years, with small production; in 1916, 5,196,239 lb. Figures for 1917 are not at hand. It will be seen that production in 1916 was less than one-half of that in 1912. Weed refers to the company's Mother Lode mine as being "now nearly exhausted," and adds, "It was only possible to operate the smelter profitably because of the high price of copper." The company has, however, in its Lone Star property, situate just across the International Boundary line, in the State of Washington, approximately 300,000 tons of ore developed by drilling and other work, of which quantity it is stated that in April, 1916, 170,000 tons of 1.60% copper constituted the ore reserves. Comment made is: "Average assay value of Lone Star ore is higher than that of other Boundary district ores, but ore is silicious and as it contains alumina as well it is much more refractory. Most of the Lone Star ground is still unprospected." The Canada Copper Corporation's smelter at Greenwood has three blast-furnaces, total capacity more than 2,000 tons of ore a day, but all are not in regular operation. In the converter-house there are two stands with 84 x 126 in. shells taking matte with from 25 to 55% copper and producing blister of 99 to 99.5% copper, containing 20 to 50 oz. silver and 5 to 10 oz. gold per ton.

Similkameen.—In strong and favorable contrast to the situation at the Canada Copper Corporation's Mother Lode property near Greenwood, is that at its Copper Mountain mine, near Princeton, Similkameen district. Weed states that the ore reserves here are estimated at 10,000,000 tons developed ore and 2,000,000 tons probable ore; assay value, 1.74% copper and approximately 35c a ton in gold and silver. "Careful geological study suggests the possibility of eventually doubling the present tonnage of assured ore." A published estimate of future operations is that with treatment of 1,000,000 tons per annum, a yearly output of 27,400,000 lb. of copper will be made. The life of the property, based on present ore reserves, is estimated at twelve years. A contract has been let for the construction of a railway about 13 miles in length from Princeton, and completion by the middle of 1919 is expected. Meanwhile, the erection and equipment of a 3,000-tons a day concentrating mill is to be proceeded with. Concentration will include the flotation process, a 40-ton experimental mill having satisfactorily demonstrated its suitability to Copper Mountain ore.

Coast.—Information supplied to Dr. Wilson was in effect that normal production of the Britannia mines, in Vancouver mining division, was 15,000,000 to 18,000,000 lb. of copper per annum and that when work under way in 1915 should be completed, production would be about 25,000 lb. per annum. It is probable

that the higher output has now been reached, but no official information to this effect has been received for use in this review. Higher costs of labor and materials, aggravated by increased Provincial Government taxation, are reported to have influenced the management of the Britannia Co. in the direction of curtailing the intended expansion of operations. Ore reserves were estimated to have been at the beginning of last year as follows:

Broken ore in stopes	919,322 tons, aver. 3.08% copper
Total ore developed	6,462,780 tons
Probable ore	6,756,350 tons
Possible ore	4,616,050 tons

Total 18,754,502 tons, aver. 1.97% copper

The Britannia ships selected ore and concentrate to the smelting works near Tacoma, Puget Sound, Washington. Figures for 1917 have not been received, but for 1916 they were: Product shipped, 55,186 dry tons. Average assay: Gold, 0.014 oz.; silver, 1.67 oz. to the ton; copper, 14.76%; zinc, 3.22%.

There is little to add to what has already been stated relative to the smaller mines in the lower Coast district, except that the normal production of the Marble Bay mine, on Texada island, is about 1,000,000 lb. of copper a year, though in some recent years its output has not reached that quantity. The ore is sent to the Tacoma smelter.

While there is nothing very important to state concerning copper mining on Vancouver Island, it may be of interest to mention that the Tyee smelter at Ladysmith, recently purchased by the Ladysmith Smelting Corporation, has two blast-furnaces, one 42 x 120 in. 200 tons, and one 48 x 160 in., 300 tons daily capacity. It has not yet been found practicable, though, by the present owners, to obtain sufficient ore to admit of operating except but for short periods, intermittently.

Progress in Copper Refining.

Colonel Carnegie was gracious enough to inform the Minister of Militia and Defence that the report of the commission of which he was chairman "contains the mature opinions of the most expert men in Canada on the subjects dealt with." As, however, a considerable proportion of those who busied themselves in gathering information for the benefit of the commission were laymen with but little knowledge of the subject of copper refining, it is not surprising to now find that their "mature opinions" have not since been realized. Even some of those who might have been fairly expected to be nearer facts in their forecast proved to be not entirely dependable. For instance, one well-known man, general manager for a large mining and smelting company, replying in January, 1915, to an inquiry from the mining committee of the Vancouver Board of Trade, is quoted in the report of the commission as having given reasons not favorable to the establishment of a copper refinery in British Columbia, closing his letter as follows: "For these reasons I am of the opinion that it is premature to consider the question at the present time." And yet before the close of the following year the Consolidated Mining and Smelting Co. had undertaken to carry into effect the establishment of an electrolytic copper refinery, and has since operated it successfully. There is an old adage which seems to have been lost sight of, namely, "never prophesy unless you know."

The production of electrolytically refined copper at Trail is now no longer a novelty, but is regarded as an ordinary part of the accomplishments of the metallur-

gical staff of the Consolidated Mining and Smelting Company, just as has for years been the production of refined lead, silver, and gold, and latterly, that of electrolytic zinc. Thus it has proved the practicability of establishing the industry of copper refining in British Columbia. Its own supply of blister copper has been augmented by the addition of that made at the smelting works of the Canada Copper Corporation at Greenwood, but there does not appear to be a present prospect of the output of the Granby Co. from its Grand Forks smeltery being also obtained. The outlook for a much larger supply from interior districts, therefore, so far as known to the public, does not just now seem to be favorable. The Granby Co. will no doubt continue for some time to come to ship its blister copper from its Grand Forks Smeltery to the refinery of the Nichols Copper Co. of New York, with which it has a contract.

Nor does there seem to be good reason to look for the establishment of a copper refinery on the coast of British Columbia in the near future, unless it shall be undertaken by the Granby Co., for outside of the copper production of that company and the Britannia Mining and Smelting Co. there is not likely to be any considerable quantity of copper available for refining purposes after allowing that the last mentioned company is under contract to ship to the Tacoma smeltery which already has its own copper refinery established, for four or five years longer. It may be that sources of copper supply not at present known to the writer may a little later become available, but there does not at the present time seem to be grounds for any other conclusion than that there is no warrant for expecting the copper refining industry to be established on the Pacific coast of Canada in the near future, unless it be by the Granby Consolidated Mining, Smelting and Power Co. in connection with its big smelting works at Anyox, Observatory Inlet, B.C.

CANADIAN COLLIERIES.

Mr. Henry S. Fleming, Chairman of the Executive of the Canadian Collieries (Dunsmuir), Ltd., who recently visited Victoria, B.C., deprecated criticism which has been leveled against the Dominion Government for the disallowance of the Settlers Rights Amendment Act, 1917, declaring that the legislation was confiscatory, and that its effect would have been to give settlers coal lands on the security of which the company had raised and invested \$16,000,000 on Vancouver Island. He said that the company gave \$11,000,000 to the E. & N. Railway Company for the coal lands and mines and since had put \$5,000,000 into development. This money had been raised in Great Britain and United States financial centres and any legislative interference with the property thus mortgaged would result in shaking confidence in British Columbia securities.

CAN EXPORT MANGANESE ORE.

Permission has been secured from the Dominion Government for the export from Canada to the United States of 5,000 tons of manganese ore. Hon. Wm. Sloan, Minister of Mines, of British Columbia, has been advised of this action by Ottawa. The license applies particularly to the Curle property, near Kaslo, B.C., which has been opened recently and already has a considerable quantity of the mineral ready for shipment.

The Canadian Consolidated Mining & Smelting Co. is said to have acquired under bond a fluorspar property situated about 20 miles north of Grand Forks, B.C.

GOLD SHIPPED FROM REX MINE, MANITOBA.

The Pas, Man., June 14.—The first shipment of gold from the Rex mine, which is being developed by the Mines Exploration Syndicate, of which Makeever Bros. are the managers, left here last Monday in care of the Bank of Commerce for the mint at Ottawa. It consisted of 300 ounces, valued at \$6,000, and was the result of the mill's first month's run.

Walter Neal, the engineer in charge of the property, is to be congratulated on having got the mill in operation in the short space of time of 18 months, and having overcome many obstacles in the prosecution of the work incidental to the developing of a property where the means of transportation were so difficult to overcome.

Makeever Bros. have pushed work ahead on the Rex property energetically, and the development of the district will be greatly stimulated by their efforts. This enterprising firm, through its representative, Walter Neal, has now taken over the management of the Northern Manitoba Mining and Development Co.'s property, just south of the Rex at Herb lake. A crew of men are already at work, in charge of Archie Close as foreman. They are enlarging the shaft to two compartments and retimbering. As soon as this is done sinking will be resumed and work pushed with energy.

Returns for a shipment of six tons of ore from the N.M.M. & D. Co. property, just received from Trail, B.C., show a value of \$103.10 per ton in gold.

Application has been made to the Lieutenant-Governor for power to increase the capital stock of the Northern Manitoba Mining & Development Company, Limited, from \$250,000 to \$1,000,000, such increase to be divided into 750,000 shares of \$1.00 each.

ANOTHER GOLD DISCOVERY AT HERB LAKE.

The Pas, Man.—A sensational discovery of gold has been made by Paul Gasse, who located several claims on a dyke situated at the north end of Herb Lake, and which he has traced about 4,500 feet. It shows a width of from 50 to 100 feet and pans gold freely. Samples show an assay value of \$9.00.

In addition to the large dyke, about half a dozen veins of widths varying from 6 to 24 inches have been found. These are all heavily mineralized. All these finds have been made in the granite or gneiss formations at the north end of the lake, which have hitherto been shunned by prospectors as being of little use. About thirty claims have been staked around the original discovery. Amongst the lucky ones are Edgar Stuart, W. S. Brady, Marshall Ballard, O. Badger, Julian Campbell, Mike Hackett and others. Apex Extension claim, owned by J. C. Little, of this town, and Bob Hassett, well known prospector and ex-army man adjoins the new find.—The Pas Herald.

SHIPPING COPPER ORE FROM THE PAS.

The Pas, Man., June 14.—The Ross Navigation Company is having great difficulty in navigating the Big Stone rapids and waters of Cumberland lake, and the ore from the Mandy mine is very slow in coming down so far. But, as the water should now start rising, it is expected that in the course of a few days shipments will come through regularly. The C. N. R. spur is now completed, and everything in readiness to handle the barge loads of ore as they arrive.

Two cars of ore were sent out by C. N. R. on Monday last to the Consolidated Mining & Smelting Co. at Trail, B.C., and the shipments will be continued until the 8,600 tons at Sturgeon Landing have been cleaned up.

WHO OWNS THE COAL ?

The action of the Dominion Government in disallowing the British Columbia Provincial Government's Statute of 1917, known as the Settlers' Rights Amendment Act, has created a furor in British Columbia, because it has the effect of nullifying the claim of early settlers on what is known as the Esquimalt & Nanaimo Railway Co.'s land belt to the coal rights within that section of Vancouver Island, an area of 3,296 sq. miles, and because it confirms the title of the Canadian Collieries, Ltd., to the greater part of this coal. Interest is strengthened owing to the fact that the Granby Consolidated Mining & Smelting Co. purchased from settlers, who had obtained title under the Provincial statute, since vetoed by the Canadian Government, two blocks of coal land, which it has been engaged in developing and on which already it has spent about \$300,000. The company, therefore, finds itself in the position of having made a very considerable investment on property, the title to which, to put it mildly, is questioned. The importance of the issue may be better appreciated when it is stated that in a report made by Mr. B. D. Dowling, of the Canadian Geological Department, in 1915, the actual reserve of bituminous coal within this tract of land was placed at 1,060,000,000 tons.

Without going into the history of the controversy, as between the E. & N. railway company and the settlers, which extends over half a century and is somewhat intricate, it may be explained that the company came into possession of this block of land in 1884 as a subsidy for the construction of the railroad. The Government of British Columbia, anticipating the granting of such a subsidy, had reserved these lands in 1873, two years after the province became a part of the Canadian Confederation. Between 1873 and 1884 quite a number of settlers took up parts of these lands, in spite of the reserve which they claimed, and still claim, was not good in so far as it applied to the undersurface, or coal and other mineral rights. When the company got the block, it also was specified that it should have "all coal, coal oil, ores, stones, clay, marble, slate, mines, minerals and substances whatsoever thereupon, therein and thereunder." Thus there developed a direct issue between the early settlers and the railway company which became particularly acrimonious when it became clear that the coal resources were rich and extensive. In 1904, the British Columbia Government recognized the property rights of the settlers by giving them a year in which to record their claims. Many availing themselves of the opportunity, got provincial title to the coal, which the railway company fought through the courts and in Ottawa, without success. Finally, the company agreed to leave the settlers in peace on the Provincial Government giving 20,000 acres of other public lands in lieu of that alienated. Then it was represented by many other landowners that, not understanding the position, they had failed to make their application, and that it was not just to them that their claims, which were sound, should be disregarded. Consequently, in 1917, the present British Columbia Government passed the Act, since disallowed, which gave a further period for the registration of applications to coal rights in the belt. The gates thus thrown open, 179 applications were made, covering, according to a statement issued by the company, 33,000 acres, about 90 per cent. of which refer to coal lands, and the "greater part of which, it is believed, contain coal

seams of commercial value." Some of these were investigated by the Provincial Government and a number allowed, and it is the latter which the Granby Consolidated Mining & Smelting Co. purchased and to which reference has been made.

One of the strong arguments of the Canadian Collieries (D) Co., in its petition for disallowance, was that, having purchased property, and mines, and the greater part of its coal rights from the E. & N. Company, it had pledged it as security in the issuance of a bond issue of £2,054,800 and in the sale of preference shares to the value of \$5,000,000. It was maintained, therefore, that any legislation which permitted the estrangement of any part of this property would have the effect of damaging the credit of British Columbia in the money markets of the world.

Development of Coal Properties by Granby Company.

In view of the position in which the Granby Consolidated Mining & Smelting Co. finds itself through the Dominion Government's attitude on the settlers' rights issue, it is interesting to show what it has done on the coal lands, the title to which now seems doubtful. A standard gauge railway has been built into the mine site, a distance of a mile, and part of it has been laid through sandstone rock, necessitating heavy cuts at places. At the end of the spur, the necessary grading for the different tracks at the mine yard is completed and some of the tracks are laid. A temporary tippie has been constructed at the mine yard, a little to one side of where the main tippie will be erected, and all preparations are made for the shipment of coal at any moment. Some seven hundred tons is lying at the mine mouth for shipment. Fifty acres of land have been cleared and graded for mine buildings and dwellings to accommodate employees. Nineteen substantial dwelling-houses are under construction and almost completed and foundations are in for a large number of permanent mine buildings, including office, mess house, store, lamp house, etc. A good substantial saw-mill has been erected capable of turning out 12,000 feet per day. A large brick smokestack and foundations for two 250-h.p. boilers have been completed and two sterling water tube boilers are on the ground ready for installation. Three slopes are in course of being driven for. The slope for the manway is now down a distance of 196 feet, and at the face, the coal is 11 feet in thickness and of good quality. At a point 175 feet down, a level has been driven to the right at right angles to the line of the slopes, and places are being driven back from the level to connect with the other two slopes which are being driven from the surface. This level has been driven in a seam which averages 11 feet in thickness, so that it may be said that all three slopes have 11 feet of coal at the faces. \$300,000 has been spent to date on this development and the mine will be ready to ship 300 tons a day within two months and by the end of the year should be producing 700 to 800 tons daily. When the investment at the mines is added to that at Anyox, the company's smelter centre, where by-product coke ovens are being installed, it will total in the neighborhood of \$1,000,000.

Extensive development work is being done at the Florence silver mine, according to F. R. Wolfle, manager and principal owner of the property. The mill has been operating since March 10 with one shift of men and on May 12 two shifts were put on. There are 60 men employed at the mine and mill. Mr. Wolfle expects that later in the spring the number of employees will be greatly increased. The shipments of ore from the Florence for April amounted to 370 tons.

"Foghorn" Macdonald on Life in New York and London

The July number of "The American Magazine" features the story of Major Neil (Foghorn) Macdonald, who, at the age of 53, enlisted as a private in a machine gun company at Winnipeg in the early days of the war, and who has a distinguished record for service at the front. "Foghorn" has been well known in mining centres in Canada for many years, and he has been an outstanding figure in the Canadian army from the day he enlisted. The story which appears in the "American" will be read with much interest, especially by those who are fortunate enough to know him—and the number of these is great. Unfortunately, it is not permissible to print "Foghorn's" stories as he tells them, for he delights his audiences with the picturesque western language, of which he is a master. Neil is a fighter and no soldier knows better what he is fighting for.

"Foghorn" is an exponent of outdoor life, as will appear from the following reply to an interviewer's questions:

"I haven't got anything against New York. It's a nice enough village to stay in for about a week. But if you want to come up to the fifty-seven year mark with a relish for food or a fight, you want to live in the open. That's the way I've lived. I can ride and canoe and hunt and tramp. I got up early and worked like the devil. And I went to bed when I was through, and slept like a baby. I ate honest food and plenty of it—when I could get it. My meals weren't always on time, a few days late now and then. But they never missed coming, if I waited long enough. I never wore out an office chair, and I never wore out myself—and that's something not many men of fifty-seven can say if they've lived in towns.

"As for London, or England itself, for that matter, well, if I was a German I wouldn't waste my breath saying: 'Gott strafe England!' The folks that have to live there don't need any more punishment than that. Which is a rotten shame, for they are as fine folks as you'll meet anywhere.

"What they've got in England isn't a climate. It's a calamity! They put a steam radiator in your room, to be sure, but that's just camouflage. If they ever turned any steam into it, the thing would blow up in sheer amazement. They bring you as much coal as you can hold in your two hands—if your hands are small—and they charge you a guinea for making it smoke a little. They don't have any heat in their houses, and they don't wear enough clothes to wad a gun with! They get so used to being half frozen that they think they like it. They'd have spontaneous combustion and catch fire if they ever got really warmed through.

"You can have your London and your New York for all I care. The big West and the North for me! Montana's the place to live. You could build a wall around that state and never have to go outside for anything you wanted except tropical fruits and cotton. A man's word is as good as his bond out there. They began living that way when the courts were few and feeble. And now they've trained up their courts in the way they should go, so that a man's word is still as good as his bond, even if he has to go to law to have it settled."

"Did you get your nickname of 'Foghorn' out there?" I asked.

"I guess so. I've had it so long I don't remember who began it. But I do remember one time I was telephoning from Butte to Missoula, and Bob Smith—used to be governor of Montana—was there and he said:

"'Foghorn, why in hell do you waste money telephoning clear across the state? Stick your head out of the window! They'll hear you just as well.'"

When I asked him about the army rations, we were sitting at a table in the palm room of a New York hotel. Don't mind his verbal trimmings. You wouldn't, if you heard them at first-hand. He gave a scornful glance at the food on the table and replied:

"Hell! I had more to eat in the trenches than a whole gold mine would buy here in New York! This morning, at breakfast, a waiter shoved two little rolls at me—you had to squint twice at the plate to see 'em at all.

"'What's that?' I said.

"'R-r-rolls!' the waiter stuttered.

"'Go to blazes!' I said. 'I could stick one o' them in each cheek and then have room left to whistle through 'em for more. When I get up in the morning, I'm a full-grown man with a full-grown appetite. I ain't a canary bird!'

"Over there in France, I could eat a whole box of bully beef," he went on, "twenty-four pounds to the box—and all I wanted to leave was the cans. They used to feed us well and we bought a lot of junk for ourselves, besides. Fresh eggs? Why, you could buy 'em there cheaper than you can steal 'em in New York!

"It ain't so much what you eat, anyway, as the appetite you bring to it. I walked a hundred and fifty miles once in four days with nothing to eat but half a skunk. It was good, too! Nothing the matter with it except its size. I wished it had been big as an elephant.

"The trouble with you city folks is that your menus are bigger than your appetites. Anyway, it takes all your strength to pick out some little morsel you think you can pay for. Get out into the open, and you won't care what you eat, so long as it's something you can get your teeth into."

NEW BRANCHES OF CANADIAN MINING INSTITUTE.

At the meeting of the Rocky Mountain branch of the Canadian Mining Institute in Fernie, on March 30th, the proposal to form a Northern Alberta branch was favorably discussed. On May 14th at a meeting held at the University of Alberta, it was decided that a branch be formed and the following officers were elected: Dr. J. A. Allan, chairman; N. C. Pitcher, vice-chairman; J. T. Stirling, secretary-treasurer; N. M. Thornton, A. C. Dunn, John Shanks, L. C. Stevens and Thomas Henderson.

The Manitoba branch was formed at a meeting held in the University of Manitoba on April 18th. The officers are Dr. R. C. Wallace, chairman; G. R. Bancroft and T. B. A. Price, vice-chairmen, J. S. De Lury, secretary-treasurer; E. V. Neelands, W. T. Neal, Capt. G. B. Hall, J. W. Harris, F. de Sieyes, E. W. Jackson and E. E. Kain.

GRANBY.

The Granby Consolidated Mining, Smelting and Power Company has blown in its fourth furnace at Grand Forks, B.C., according to a report from that place. Three furnaces have been smelting almost as much ore in recent months as has been handled by four heretofore. The fourth was started to provide for an increase in the volume of ore reaching the plant.

THE BOUNTY ON ZINC

Victoria, B.C.—To the operators of the silver-lead-zinc properties of British Columbia the announcement that the Dominion Government has offered a bounty of 2 cents a lb. on all the zinc mined and smelted in Canada is of special interest. Owing to the special conditions this encouragement to the zinc industry will have a direct and no doubt a beneficial bearing on conditions in British Columbia; in fact, there is no doubt that it was designed with a twofold object in view, namely, the forestalling of the threatened closing down of the electrolytic zinc plant at Trail and the maintenance on a shipping basis of the many mines of the Sloean and East Kootenay Districts of British Columbia producing ore of the character in question. There has been some criticism in the Province on the ground that the bounty will be an aid to the Canadian Consolidated Mining & Smelting Company; but those most conversant with the problems which that concern has been and still is facing in dealing with the refractory ores referred to believe that the policy is warranted; that without a subsidy it would be impossible to keep the electrolytic plant going and avoid considerable loss; that the company probably would have been compelled so to do in view of the present quotation on ordinary prime spelter; and that such action not only would have thrown a large part of the Trail plant into inaction, but would have had a similar effect on many of the British Columbia mines which have been largely developed since the beginning of the war.

The refining of zinc in British Columbia dates from the beginning of the war, or rather a very short time afterwards. The story of the phenomenal rise in price of zinc is well known. Great Britain and her allies contracted for all there was available in the United States and quotations soared to 40 and 50 cents a pound. About that time the Imperial Munitions Board, having information regarding the very large bodies of zinc bearing ores of British Columbia, came to the Trail smelter interests and said, in effect, "If you are in a position to build, equip, and operate an electrolytic zinc plant we will guarantee you a market for all your zinc at 15 cents a pound for a specified number of years." To this the company agreed and the plant was installed. The expense involved went over six figures and, as a result, it became possible to handle successfully the silver-lead-zinc ores of the Province. The company fulfilled its contract with the Imperial Munitions Board. For a time it was supplying zinc at 15 cents when the outside prices were 40 cents a pound and over, but it had the satisfaction of knowing that it was in no way subjected to the fluctuations of the market and, while its understanding with the Board endured, it would not be affected by the metal unloaded by plants which sprang up all over America following the shortage to which reference already has been made.

There came a time, however, and it was not long ago, when the contract expired. Then, if the company was to continue its production, the electrolytic zinc of British Columbia would have to meet in open competition the prime spelter of the Belgian or distillation process. The quotation, which approximately still prevails, 7 cents a pound, according to the company, would not permit the maintenance of the electrolytic plant. It was because of the development of this situation, and the possible consequences of the cessation of its operation, which induced the Dominion Government, from all accounts, to adopt the policy indicated. With the

2 cents bounty the company will be in receipt of 8 cents a pound for its product (at present prices) and, no doubt, with this advantage, will be able to carry on. If the price rises the bounty diminishes and is eliminated entirely when market price reaches 8 cents.

Advocates of the bounty in the Canadian Parliament said that it was not proposed that it should continue for all time. It was a temporary expedient having the object of tiding the industry over a critical stage. Experiments were in hand in relation to the electrolytic process which, it was hoped, would make it possible to recover the zinc at less expense than at present and thus make the balance more even as between the output of the electrolytic and the Belgian processes. It has been stated that the subsidy will operate to the disadvantage of the French Complex Ore Reduction Co., which has been supported financially by the Provincial Government, and which is expected to solve the problem of treating the complex ores of the Canadian West. The answer given is that the bounty applies throughout Canada and that the product of the French Complex Company, in common with that of all others in the Dominion, will derive equal benefit.

By way of further explanation of the Canadian situation it may be said that there now is no special market for electrolytic zinc. The Imperial Munitions Board is not taking it, because it has supplies sufficient to meet all its needs. The reserve was considerably increased when large quantities intended for the Russian Government had been left on the hands of the British authorities.

WILL USE COAL INSTEAD OF OIL.

The possibility of fuel oil being unobtainable from California because of war exigencies is occupying the attention of most of the large industrial corporations of British Columbia which have been dependent on that form of fuel. The Powell River Pulp Company, one of the largest industries of its kind in the Northwest, has arranged to make a rapid change from oil to coal, should developments make it necessary. The same is true of the Whalen Pulp & Paper Mills while Mr. W. P. Hinton, vice-president of the Grand Trunk Pacific Railway Co., who was in the West a few days ago, states that his company has made representations at Washington, D.C., with a view to ascertaining the attitude of the United States Fuel Administration to the reported shortage of California fuel oil. Mr. Hinton explains that his company is particularly interested because of the steamers which it is operating in the Pacific Northwest. It is the intention to reconvert the G.T.P. locomotives using fuel oil on the 800 miles of line westerly to Prince Rupert to coal burners, and in this connection the company is interested in the development of the Telkwa and other Northern British Columbia Collieries, which are tributary to the Grand Trunk Pacific Ry.

An increase of wages has been demanded by employees of the Canadian Consolidated Mining and Smelting Co. in several of its mines. In most instances the miners have accepted the company's offer of substituting the Rossland mines scale in the lead mines, which means an increase of approximately 15 cents a day. Some, however, have refused this proposal. At the Sullivan mine, Kimberley, B.C., an increase of 50 cents a day was asked, which would give muckers \$4.15 a day and miners \$4.65.

WHY THE ELDORADO TALC MINE HAS BEEN IDLE.

Under a Madoc date line, the "Globe" recently published the following:

"The spirit of the British people is splendidly illustrated in a story that comes from the little mining village of Eldorado in the County of Hastings. The people of Canada will be surprised to hear that at the outbreak of war a brother of Sir Douglas Haig, the British Commander on the Western front, was in charge of a talc mine in this county, but they will not be surprised to learn that he went home to do his bit. Notwithstanding that he was sixty years of age, John Haig, elder brother of the Field Marshal, closed up his mining business and left for Britain, where he volunteered as a private. He gave his age as fifty and did not look a day older, it is said, the outdoor life having preserved his youthfulness. He was rejected, but did not give up the idea of going to the trenches. His brother, Sir Douglas Haig, did not know John was trying to enlist, for the latter apparently never told him. At all events, he did not use his influence to get a commission, but by his persistence and personality, he eventually secured a commission as second lieutenant, and is to-day a captain in a British infantry regiment, "somewhere in France." Mrs. Haig crossed the Atlantic with her husband and is nursing wounded soldiers, according to residents of the Eldorado district."

In this connection, it is interesting to note that the president of Eldorite Ltd., the company operating the Eldorado talc mine, is Sir Douglas Haig. His brother, John A. Haig, is managing director and was in charge on the property. The company owns the mine and mill at Eldorado, having taken over in 1914 the property of Canadian Talc and Silica Co.

RE-EDUCATION OF RETURNED SOLDIERS.

Ottawa, June 23.—The party of American technical educators who have been touring Canada, studying the work of industrial re-education of disabled soldiers, returned to Ottawa Friday morning and spent the day in conference with W. E. Segsworth, head of the Vocational Branch of the Department of Soldiers' Civil Re-establishment. They left for New York yesterday. They visited, Ottawa, Montreal, Ste. Agathe, Toronto, Winnipeg, Saskatoon, Edmonton, Calgary.

A member of the party said: "We have worked very hard, and our studies have been most valuable. One great surprise we had was in reference to the scope of the problem. Most of us, owing to having read a great deal of propaganda literature from France and other countries, were inclined to think that this work of re-education was limited to crippled men—that is, men with arms and legs off. We find, however, that these are only a small proportion of the disabled men who need re-education. A gunshot wound in the body or the head may produce a disability which in specific cases impairs vocational efficiency to a greater extent than the loss of an arm or leg. We were much impressed with the work that is being done in Canada, and were especially struck with the wonderful optimism of the men undergoing the training."

VIPOND.

Good ore is said to have been encountered at the 425 ft. level of the Vipond. Assays of samples across the workings show values of between \$20 and \$50 per ton, according to a wire received in Toronto by H. B. Wills.

JAMES DOUGLAS IS DEAD.

New York, June 25.—Dr. James Douglas, for many years president and lately chairman of the Board of Directors of Phelps, Dodge and Co., copper mine owners, died at his home here to-day in his 81st year.

Dr. Douglas was rated one of the foremost metal and mining authorities in the world. He was also a historian and writer of note and a philanthropist. He amassed a large fortune in his business.

He was born in Quebec, Canada, Nov. 4, 1837, was a distinguished graduate of Queen's University, Kingston, Ont., where he graduated in 1858, later receiving the degree of doctor of laws from McGill University for his work in the field of hydrometallurgy. In this he was associated with Dr. T. Sterry Hunt.

James Douglas, besides being an A.B. of Queen's University, studied medicine at Laval University, Quebec, and was professor of chemistry at Morrin College, Quebec. He acquired his first experience in mining and metallurgy through his connection with the Harvey Hill mines and other mining properties in Lower Canada, and left Canada in 1875 to take charge of the metallurgical operations of the Chemical Copper Company, a concern operating at Phoenixville, Pa., where he was first to separate, on a commercial scale, the precious metals from the copper by the electrolytic method of refining.

Dr. Douglas was Chancellor of Queen's University and its most munificent benefactor.

No. 3 MINE, CROWSNEST, RE-OPENED.

No. 3 Mine, Crow's Nest Pass Collieries, in which an explosion causing the death of 34 miners occurred on the 5th of April, 1917, has been opened to the face after fourteen months of work. When the inquest took place a few weeks after the accident only 22 bodies had been recovered. All now are accounted for, the majority having been found as the level was cleared and the last four about ten days ago when the face was reached. It is thought likely that the inquest will be re-opened, the verdict returned last April having been that "death was caused by an explosion, but from the evidence adduced the jury is unable to assign the primary cause." It is claimed by those who have held that the explanation of the disaster would be found when the scene at the most remote working place could be surveyed that the position in which the last four bodies were discovered to an extent bears out their contention. The evidence, however, seems to be conflicting. The men practically died at their posts. In each case their posture was such as would indicate that they had had some warning and had instinctively tried to shield their heads with their hands. One of their safety lamps was broken, and it is argued that this may have happened prior to the outbreak and be responsible for it. Mr. George Wilkinson, Chief Inspector of Mines, has left Victoria to make a careful examination of the mine and of the additional evidence secured.

Mr. E. P. Mathewson, until recently general manager of the British America Nickel Corporation, Toronto, has been appointed consulting metallurgist of the American Smelting and Refining Co., and its subsidiaries. His headquarters will be at the company's offices in New York.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Mixing Canadian and American Lead Ores in B.C.

The wisdom of the imposition of an import duty on all raw ores coming into Canada was referred to during the closing days of the last session of the House of Commons. There is no doubt that, generally speaking, this would meet with considerable favor in British Columbia. It would not, however, be welcomed by the Canadian Consolidated Mining & Smelting Company, the largest smelter of Western Canada. The argument against it appears to be very strong, and it is considered doubtful whether, under the circumstances, the Federal Administration would adopt such a policy. In the first place, referring only to this Province and without any special knowledge of the conditions in the other Provinces, the imports of ore from the United States are not sufficiently large to warrant it. Secondly, the importations that have taken place, if the representations of the smelter officials are to be taken at their face value, have their basis in good sound reason. British Columbia lead ores carry excess zinc. A lead furnace cannot operate with over 12 per cent. zinc in the charge. As the British Columbia ores carry more, they must be diluted and consequently it is necessary to import from Washington lead ores nearly free from zinc. It goes without saying that the Canadian company in order to get this foreign lead must outbid the American smelteries nearer at hand and the former maintain that what they are doing is not to the disadvantage of the Canadian operators, from whom the complaints have come, but rather to their advantage as it is to render possible the treatment of their product.

Will Investigate Smelter Charges.

Within the next few months it is hoped that all matters of difference between the Canadian Consolidated Mining & Smelting Company and the mine operators of British Columbia will be satisfactorily adjusted. The Dominion Government has authorized the investigation of the company's schedule of charges and, in fact, its affairs in general, by a Commission. The personnel has been announced and seems to be satisfactory to all parties. It had been thought that its deliberations would have been in progress before, but delay has occurred owing to the fact that the Commissioners want a more exact definition of their powers. The inquiry, however, is to take place. It is assented to by the company, the management of which has agreed to throw everything open to scrutiny and it is believed that the outcome will be the establishment of a better understanding.

Dr. Stansfield Investigating B.C. Iron Smelting Possibilities.

Dr. Alfred Stansfield, D.Sc., A.R.S.M., F.R.S.C., Professor of Metallurgy at McGill University, Montreal, who has been commissioned by the British Columbia Government to make a special investigation and report on the adaptability of the iron ore of the Province to electric smelting, has arrived in Victoria and has the work in hand. He intends visiting Heroult, California, in the course of his researches, this being the only place in America where ores are being smelted electrically. The conditions at Heroult are believed to be much similar as to the quality of the ores handled and in other respects to those found in British Columbia which will make Dr. Stansfield's personal observations of value in the compilation of his report as to

costs of plant installation, quality and cost of product, etc., officials of the Heroult plant have assured the Canadian expert that he will be given every facility for the pursuit of his work at that point.

Making Pig Iron at Port Moody.

Pig iron is being cast from an electrically operated furnace in British Columbia, the new plant being that installed by the Aetna Iron and Steel Company at Port Moody. The pig is manufactured from scrap and the first runs were very satisfactory. It is a six ton furnace, with a capacity of about twenty tons of pig iron a day. Power is obtained from the Western Power Company of Canada, 1,300 h.p. being used in operation. Contracts for 2,000 tons of pig iron have been obtained, a portion of which will go to Japan.

Canadian Collieries New Plant in Operation.

The Canadian Collieries (D.) Ltd., has practically completed development work in connection with the opening of a new coal mine at South Wellington. The Douglas seam has been struck with a thickness of between 10 and 12 feet at the face. On Monday, the 17th June, the new tippie, screening plant, etc., was in operation for the first time and within a short time the output will be maintained, if expectations are realized, at between 750 and 1,000 tons a day. The product of this company at both its Extension and Comox Collieries, Vancouver Island, runs to about 70,000 tons a month.

Canadian Western Fuel Co. Opening a New Coal Mine Near Nanaimo.

The Canadian Western Fuel Company, of Nanaimo, B.C., has commenced operations on the sinking of a pair of shafts for the opening of a new mine on the company's farm near Nanaimo. These shafts are of ample dimensions, and are situated 150 feet apart. They are being sunk to tap the Wellington seam and will mean the area south-east of Jinglepot mine. Extensive drilling operations have been under way for some time to prove the measures and locate the best position to place the shafts. Excavating of the surface subsoil to bed-rock has been completed and concrete collars placed around the mouth of the shafts. Work on the hard stratified bed-rock commenced on Monday, the 17th of June. The seam will be uncovered at about 350 feet depth and if conditions are normal, coal should be reached in about four months. The cost of opening and equipping will involve an expenditure of about \$300,000. The company is producing upwards of 70,000 tons a month from its mines now in operation and looks forward to a considerable augmentation of this total. This will make the third new mine opened in the vicinity of Nanaimo, Vancouver Island, during the past year, the other two being now in coal. One was developed by the Canadian Collieries (D), Ltd., and the other by the Granby Consolidated Mining & Smelting Co.

The coal produced by the Vancouver Island (B.C.) mines during the month of May totaled 143,379 tons. This is 4,718 tons less than was produced in April, which is accounted for by the May holidays.

The tonnage produced by the various collieries was as follows:

	Tons.
Canadian Western Fuel Co., Nanaimo Colliery...	63,807
Canadian Collieries (D), Ltd., Comox Colliery.	50,163
Canadian Collieries (D), Ltd., Extension Coll'y.	19,781
Pacific Coast Coal Mines, Ltd., S. Wellington.	7,660
Nanoose Collieries, Ltd., Nanoose Colliery	1,968

143,379

The coal produced by Vancouver Island Collieries for the five months up to and including May, 1918, totalled 717,266 tons, as follows:

	Tons.
Canadian Western Fuel Co., Nanaimo Colliery.	328,299
Canadian Collieries (D), Ltd., Comox Colliery.	232,255
Canadian Collieries (D), Ltd., Extension Coll'y	97,781
Pacific Coast Coal Mines, Ltd., S. Wellington.	42,764
Nanoose Collieries, Ltd., Nanoose Collieries...	16,167

717,266

In spite of the fact that the Jingle Pot Mine, Nanaimo, has been closed all year; that Nos. 1 and 2 Slopes of the South Wellington Colliery of the Pacific Coast Coal-Mines have been abandoned; that No. 4, Extension Colliery, of the Canadian Collieries (D), Ltd., also has been abandoned; that No. 6 Mine, Comox Colliery, Canadian Collieries (D), Ltd., has been closed; and that some of the other mines have been put on single shift because of lack of labor, the tonnage of the Island Mines has been maintained to last year's standard, within a few thousand tons. To date the Western Fuel Company has made a gain over last year's tonnage of 60,000 tons and the Nanoose Collieries a gain of 9,786 tons.

NORTHERN ONTARIO.

High Grade Ore at Green-Meehan.

In addition to the mining of considerable low grade ore at the Green-Meehan property, there is also considerable high grade being encountered. The property is now being worked under the name of Edwards and Wright and under this management a discovery of high-grade silver ore was made the last week in April in a vein encountered at a depth of 245 feet. The vein was found in the diabase, close to and running parallel with the diabase-Keewatin contact. Since that time considerable lateral work has been done with favorable results and last week another vein carrying commercial values was reported to have been found. Owing to the favorable turn in developments in this section of Bucke township a good deal of attention is being shown to the immediate vicinity and much activity is anticipated.

Adanac.

According to an official advice, Mr. Alfred R. Whitman, geologist, has stated concerning the Adanac mine that "The indications seem to be entirely favorable, and that there is every encouragement to continue the North crosscut at the 310-ft. level. The flat shearing for over 200 feet back from the present face of the crosscut shows such strength and consistency, dipping towards the south that it can probably be regarded as distinct evidence of the correctness of former calculations regarding the dip of the diabase contact which the crosscut is approaching. The flat shearing which is coming in from the west dipping from the south-east instead of being contradictory evidence, rather tends to confirm the contour of the contact on former plans drawn. The vertical joining also tends to confirm the evidence of inclined shearing. The most economical exploration will be to continue the present north crosscut for probably 150 feet further before driving branch cross-cuts. When that point is reached the branch cross-cuts if driven should go both to the right and left equal distances." The conditions at the property are considered to be highly favorable for the development of commercial ore in the near future.

Private Wire to New York.

The Cobalt branch office of Messrs. Kiely, Smith &

Amos has been purchased by the brokerage firm of Hamilton B. Wills. Mr. A. A. Amos, who formerly handled the business, is being retained by the new owner as business manager. A direct wire service, the first of its kind to connect Cobalt and New York, has been installed and the inauguration was in the form of greetings between the Mayor of Cobalt and Mayor Hylan of New York City.

Extending Cobalt Area.

Considerable enthusiasm is apparent regarding the discovery of native silver made since the taking under option of forty acres of land on the west side of the Nipissing Central Railway from the N.C.R. by the Mining Corporation of Canada recently. This company is also negotiating for the purchase of two other claims, while a number of other Cobalt mining companies are also becoming interested in the district. Deals for properties now pending are: the Pride of Cobalt, and the Stratheona to the west of the track, and the Ruby Silver Mining and Development Company to the east, which property adjoins the Green-Meehan on the southwest. It is pointed out that a contact zone extends from the shore of Lake Temiskaming at a point known as Devil's rock and runs northwest for several miles through the township of Bucke. Considerable shearing occurs along this zone and a number of promising veins are in evidence. Enthusiasts declare that this heavy shear zone in Bucke township is the direction in which to look for the mother lode of Cobalt. While conservative mining men are sceptical, they look upon the peculiar structure of the Bucke township contact as decidedly interesting and worth investigation. In the meantime considerable exploration work is contemplated and the results of this will determine the correctness or otherwise of these different theories.

Kerr Lake Makes New Record.

During the month of May the greatest amount of silver for any single monthly period in its history was produced at the Kerr Lake Mine, the output amounting to approximately 268,213 ounces. As the company's working force is comprised of only about 105 men, the production from the property is around 2,500 ounces per man for the month. The cost of production at the property works out at a little over 25 cents per ounce and as the price of silver is close to the dollar mark, it therefore costs about twenty-five per cent of the total revenue for production, leaving a net profit in the neighborhood of seventy-five per cent. This indicates a net profit for the month of May of close to \$200,000, or at the rate of over \$6,000 daily. Compared with the month of April this is an increase of about sixty-seven thousand ounces of silver.

The company has introduced the "cafeteria" system of serving meals to its employes and has had it in force for the past fourteen months. The results of this method have been highly satisfactory, permitting of fewer waiters in the mess rooms and giving entire satisfaction to the management and employes alike.

Prospecting in Doherty District.

Considerable activity is apparent in the Doherty district. However, owing to the scarcity of men the work so far has consisted chiefly of trenching and sinking of test pits. In a number of instances discoveries of Cobalt bloom, and low silver values have been made. Results to date are considered to be highly encouraging.

Nipissing.

According to the monthly report of the Nipissing Mining Company for May, ore of an estimated value of

\$338,347 was mined and bullion and residue of an estimated value of \$581,625 shipped. Favorable developments at several levels in shaft 73 were encountered, a number of new veins being found. With one exception they are not wide, but produce both high and low grade mill ore. One of the veins is from two to four inches in width and contains assays from 2,000 to 3,000 ounces to the ton. All development faces continue to maintain their average width and assay. Extension of stopes at veins 96 and the Little Silver are giving extra tonnage. Exploration work at shaft No. 63 is proceeding but nothing of any value has been encountered to date. The diamond drill has completed a series of holes in R. L. 404 and is now drilling the first of a series of holes in R. L. 402. The total production for the month of May was \$338,347 and establishes a new high record for the current year and compares with an output of \$329,617 for the month of April. The production so far this year is the greatest in the company's history despite the fact of its being the fifteenth year of existence. An aggregate of fifty million ounces of silver now lies to its credit. That high grade ore still plays an important place in the aggregate production of the Cobalt camp is amply demonstrated by this month's statement under review, which shows 195 tons treated, which had an average silver content of 2,760 ounces to the ton.

Dome Mines.

The annual statement of the Dome Mines, Limited, was given out at the annual meeting held recently in Toronto. The ore reserves are estimated at \$9,945,000 as compared with \$11,979,000 for the year preceding. One dividend was paid during the current year. The surplus at the end of March, 1917, was \$697,051, as compared with \$524,797 at the end of the 1918 period. The most interesting facts appear to be that the ore reserves showed a decrease during the twelve months under review of \$1,033,242 owing to a revision of previous estimates. This statement is made evident by the fact that although the production amounted to \$1,030,758 the decrease in reserves amounted to \$2,034,000. Another disappointing statement is that in opening up the ore body "indicated" over a year ago by diamond drilling, which was supposed to have been 117 feet wide and to contain around \$17 to the ton, development work proved that the drill rods had deflected downwards and westwards and the hole is a drift hole in a narrow ore channel 12 to 20 feet wide instead of a crosscut hole in a horizontal plane as planned; showing plainly the unreliability of diamond drilling to prove value of ore bodies. A decidedly favorable feature in the report is the fact that 321,352 tons of broken ore remains in the mine, the costs of which has been absorbed in the current working costs. When the time arrives when the resumption of operations can be economically proceeded with, the large tonnage of ore broken will permit of operations being conducted profitably from the day of commencement. It has been decided not to recommence operations at the property until economic conditions improve and the management are disposing of some \$300,000 worth of supplies they have on hand and which while idle would show considerable depreciation in value. The main shaft is sunk to a depth of 1,250 feet at which point a crosscut is being run to the boundary of the Dome and Dome Extension to prove the ore bodies which, according to diamond drilling appear to be of good width and value at this point. While the ultimate successful future of the property is substantially assured, the development

will have to await a return of more favorable conditions.

Hollinger Pays Dividend.

A big surprise was sprung on the shareholders of Hollinger Consolidated Mines when a dividend was announced and paid on June 17th to shareholders on record as of June 10th. It is understood the payment does not represent the resumption of any regular dividend policy just at present, but that distributions will depend entirely on conditions. The outstanding capital of the company is a little over \$24,000,000, so that the distribution will amount to about \$246,000. The payment of the dividend was all the more surprising on account of it coming at the time when rumors were current to the effect that curtailment of operations at the property might be necessary.

Dome Extension.

Diamond drilling is reported under way at the Dome Extension mines on which the Dome Mines dropped their option during the past year awaiting a more favorable time for development. The drill hole is being sunk near the Dome line and has already been driven about fifty feet to bed rock. The operation is designed to discover the direction of the vein system.

Kirkland Lake.

The frame work for the mill at the Kirkland Lake Gold property of the Beaver Consolidated Mines is completed and part of the structure is already closed in. The work of installing the machinery has also commenced. The Beaver owns seven-eighths of the stock in this company. Three shifts are now being worked in the three-compartment shaft which is down to a depth of 200 feet in the barren rock. This working will, when completed, be the main shaft of the mine. Ore has been developed in the workings of this property to a depth of 700 feet in the old shaft. It is expected the new 150-ton mill on the property will be completed and in operation by the fall.

Vipond—North Thompson.

According to recent information the Vipond-North Thompson property is about to close down. Operations underground are being materially curtailed. The reason for the curtailment is the scarcity of labor and high cost of material, all of which makes it more desirable to leave the gold in the ground until such time as the margin of profit is more satisfactory.

Apex.

A meeting of the Apex directors was called for June 25th to consider plans for the development of the Bilsky property in Porcupine. It is evidently the purpose of the management to exploit the promising claim, but this will require further financing.

That Gowganda Road.

The work of repairing the roadway between Elk Lake and Gowganda is now under way under the supervision of Government engineers. Definite assurance has been given the mining interests of Gowganda that the road will be placed in good shape for traffic. Up to the present time upwards of a hundred thousand dollars has been spent on this thoroughfare. It is not known how much will be required to place the road in a satisfactory condition now. This matter, however, has been left chiefly in the hands of the engineers in charge. The main thing is that transportation to this increasingly active and promising mining district is being improved.

Gold in Teddy Bear District.

The formation in evidence in the Teddy Bear district is said to be very similar to that of the Lightning River

district. It is now presumed that the Teddy Bear gold finds occur in an extension of the rock formations outcropping in the Lightning River section, and if this proves to be true the whole will constitute a fairly large prospective area. The Teddy Bear is situated about seven miles west from the Ontario-Quebec boundary and the river empties into Lake Abitibi.

Metachewan.

The Mining Corporation of Canada is understood to be negotiating for the purchase of the Davidson property in the Fort Metachewan district. Mr. Charles Watson, manager of the company, recently visited the district making examination of the property. The Davidson property is well known by reason of the fact that it represents the first important gold discovery in this new district. Other discoveries of gold had been made prior to that on the Davidson, but they did not appear sufficiently important to attract prospectors or capital on anything but a small scale. The water power on the Montreal River in close proximity to the Fort Metachewan gold district has been optioned to the Mining Corporation. A considerable volume of water pours over the falls which has a drop of approximately 45 feet. By erecting a dam this head could at small expense be increased to about 60 feet without flooding a great deal of country. It is estimated that upwards of 5,000 h.p. could be developed. Should developments in the district warrant it this water power could be made available at reasonable cost.

McIntyre.

Official figures show that the McIntyre-Porcupine mines produced during the first quarter of the current year approximately \$430,000. This is at the rate of \$143,000 a month or \$1,716,000 per annum. This would appear to indicate a net profit of \$750,000 or \$800,000. The last dividend, payable June 15th, amounted to about \$180,000. Net earnings are therefore just about sufficient to make four such disbursements annually, or twenty per cent. on the company's issued capital. This achievement under present conditions goes far towards proving the strong physical condition of the mine.

Miller Independence.

A new vein about eight feet wide has been discovered at the north side of the Miller Independence property at Boston Creek. The new vein carries visible gold and gold tellurides. Heretofore the Miller Independence has been exploring veins which were narrow and the tonnage available was comparatively small. However, the new vein just discovered, providing it proves consistent with depth will remove this difficulty. The vein is situated on low ground and is well defined with a strike approximately east and west. The work of sinking a new shaft has commenced on high ground a short distance south from this vein and owing to the latter having a considerable dip to the south it is expected it will be encountered before reaching a very great depth.

Gold from Martin Property.

A gold bar, the first shipped from the property of the Martin mining company, situated on Lake Keniwisik, some 46 miles from the railway, near Amos station on the Transcontinental railway in North-Western Quebec has been sent out. Mr. Martin, the contractor who constructed the mill of the Hollinger Gold Mines, with a number of friends, owns the mine. The mill consists of two stamps, and the mining at present is being done from surface, the deepest shaft being down a depth of about thirty feet. A force of twelve men do the mining and milling and the employees are all shareholders of the company.

Elliott-Kirkland.

Drifting at the 400-ft. level of the Elliot-Kirkland property is under way and ore of a commercial grade has been encountered, thus establishing the fact that the vein is the westward continuation of the ore body of the Kirkland Lake Gold.

Kirkland-Porphry.

Work has been suspended at the Orr property in Kirkland Lake under option to the Kirkland-Porphry. A cash payment of approximately half a million dollars falls due about the 1st of September, and various rumors are current regarding the future financing of this big payment. Recent developments at the property have been of a decidedly encouraging nature and the present suspension of work would appear to be in no way due to lack of merit in the property. The continuation of the vein was recently cut at the 400-ft. level and showed a width of about 32 feet, 22 feet of which gave values of over \$20 to the ton.

Patricia.

The mill at the Patricia mine in Boston Creek district is being given a try out. Last week during an early test run a mishap occurred causing a breakdown. The part has been repaired and this week the mill is expected to receive a thorough trial. Meantime underground work is being carried on at record rate. Drifting along the 200-ft. level is proceeding. Stopping operations are under way and the ore being encountered is of a high grade.

Hattie Gold.

A new gold discovery has just been made on the property of the Hattie Gold Mines, Limited, situated in the township of Coulson, north-east of Matheson. The vein is about six feet in width and contains visible gold and tellurides. The company has a gang of men trenching and stripping and the intention is to commence sinking as soon as possible, for which purpose a plant will be installed. It is proposed to drive the shaft to a depth of 300 feet.

Ontario Kirkland.

Arrangements have been completed for the erection of an electrically driven mining plant at the property of the Ontario Kirkland Mining Company, formerly known as the Hurd property and lying about two claims to the south from the Wright-Hargreaves. The work of construction for the transmission line is under way as is also the erection of additional camp buildings. There are a number of veins in evidence on the Ontario Kirkland on one of which a shaft has been sunk to a depth of 100 feet where results met with are understood to have been up to expectations. The initial development calls for the sinking of the shaft to a depth of 300 feet, where lateral work will be carried on.

Lake Shore.

Two gold bars of an approximate value of \$45,000 were shipped from the Lake Shore mine this week. These bars weighed 92 and 93 pounds respectively, and the fact of this shipment is taken as conclusive evidence of the satisfactory operation of the Lake Shore Mill.

Ankerite.

According to reports just to hand from Porcupine the suspension of operations at the Ankerite property of the Coniagas Mining Company has been decided upon. This decision was reached following a visit of some of the directors to the property. The cost of operations during the present abnormal period for both labor and material is said to be the reason for the contemplated temporary suspension of work.

The Canadian Ingersoll-Rand Co. have just issued a new catalogue of their direct lift vertical air hoists. The booklet is well illustrated, and gives complete details of the different types of valve used for various classes of work up to five tons capacity—the dust proof single acting, the dust proof air balanced, the dust proof double acting. Complete tables are given, including a useful table of the free air consumption of the hoists.

Sullivan Machinery Co. have published a new catalogue on Coal Mining Machines, No. 73. This bulletin describes in full detail the Ironclad Sullivan Coal Cutters, for both room and pillar and longwall mining. The Sullivan Machinery Company was first to bring out an electric chain mining machine, for operating in rooms, on the longwall or continuous cutting principle, which is now generally recognized as the most efficient method of cutting coal in use in this country. This bulletin describes the direct current and alternating current Ironclad, and Turbinair Ironclads, by means of which compressed air drive is made efficiently applicable to coal cutter work for the first time. Explosion proof Ironclads carrying the Government approval, as the result of U.S. Bureau of Mines tests, are also described, and the protective devices for gaseous mines illustrated.

A unique and handy little device for opening up the water hole in hollow steel has just been placed on the market by the Denver Rock Drill Manufacturing Company, Denver, Colorado, whose exclusive sales agents in Canada are the Canadian Rock Drill Company, Ltd., of Toronto. It consists of a punch and hammer set in an air feed cylinder, which drives the punch into the steel and withdraws it in combination with the hammer action. It is designed for use with their Model 8 Sharpener to be mounted on the pedestal back of the clamping vise, but it may be mounted separately or even adapted to other machines. The operation is extremely simple and a slight alteration of the control handle will either drive it forward or withdraw it. This device will open the water hole in a bit or shank in one-tenth the time required to perform such an operation by hand.

The U. S. Railroad Administration announced under date of May 28th that the pig iron rates will apply on pyrites ore from Sault Ste. Marie, Ontario, ex Goudreau, Ont., to Cincinnati, Cleveland, Columbus and Detroit, effective May 30th, and to the other Central Freight Association points effective June 30th, by the Minneapolis, St. Paul and Sault Ste. Marie Railway. The tariffs of the Duluth, South Shore and Atlantic Railroad will be issued to become effective on statutory notice.—“American Fertilizer.”

Shanghai, China, June 24.—An agreement has been virtually concluded between the Chinese and Japanese Governments, it has been learned by The North China News, under which the iron mines at Feng Huan Shan will be worked by the Chinese Government, and steel will be manufactured by the Chinese and Japanese. It is said that the Japanese will provide 20,000,000 yen to defray the expense of carrying out the work.

This means, it is said, that the Japanese will virtually acquire control of the entire output of the mine. At present they are negotiating for the right to participate in the working of the property. Pending decision, the final signing of an agreement has been delayed.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 17 cents per lb.
June 26, 1918—(Quotations from Canada Metal Co., Toronto).
Spelter, 10½ cents per lb.
Lead, 10¼ cents per lb.
Antimony, 16 cents per lb.
Copper, casting, 28 cents per lb.
Electrolytic, 28½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.
June 26, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$10.00 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York cents.	London pence.
June 10	99½	48⅞
June 11	99½	48⅞
June 12	99½	48⅞
June 13	99½	48⅞
June 14	99½	48⅞
June 15	99½	48⅞
June 17	99½	48⅞
June 18	99½	48⅞
June 19	99½	48⅞
June 20	99½	48⅞
June 21	99½	48⅞
June 24	99½	48⅞

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock & Mining Exchange at the close of business, June 26, 1918:

Gold.		
	Bid.	Asked.
Apex .....	.03	.03½
Dome Extension .....	.09½	.10½
Dome Lake .....	.12¼	.15
Dome Mines	6.50	..
Hollinger	4.83	4.85
Imperial .....	.01	..
McIntyre	1.29	1.30
New Ray .....	.20	.20½
Porcupine .....	.13	.13¾
Vipond .....	.12	.15
Preston East Dome .....	.02¼	.03
Teck-Hughes .....	.35	.40
West Dome .....	.06¾	.07

Silver.		
	Bid.	Asked.
Adanac .....	.08	.08½
Bailey .....	.03½	..
Buffalo .....	..	1.05
Beaver .....	.24	.26¾
Chambers Ferland .....	.12¼	.14
Coniagas .....	..	..
Crown Reserve .....	.18	..
Gifford .....	.02	.02¼
Great Northern .....	.03¼	.04
Hargraves .....	.04¾	.05
Hudson Bay .....	..	34.00
Kerr Lake	5.60	5.90
Larose .....	.41½	.44
McKinley .....	.36½	.39
Nipissing	8.95	9.00

ASSAY OF TUNGSTEN MINERALS.

H. W. Hutchin of the Camborne Research Committee in a paper written for the Institution of Mining and Metallurgy, London, describes the use of cinchonine in the assay of tungsten minerals.

The assay of tungsten minerals has developed in the main along two lines of attack, viz., attack with acid and attack with alkali, either by fusion or digestion. The acid attack permits the determination to be made by means of the ignition of ammonium tungstate or mercurous tungstate, whilst the alkali attack confines itself to the mercury determination. The methods for the assay of tungsten mineral, as sold to the metallurgical works, whether the determination is based on an acid attack or an alkali fusion, are well established and satisfactory; but the position with respect to the intermediate products of the mine in the various stages from ore-bin to finished products was, until comparatively recently, very unsatisfactory. The weakness of the acid attack with poorer products lay in the frequency of low results, so low in some cases as to be reported absent when present in fair amount. On the other hand the fusion method was so hedged about with restrictions that it was too lengthy an operation for everyday use. The substitution of a selective attack by digestion with caustic soda solution for a fusion, by Hutchin and Tonks, was an improvement, but still left the position open to the objection that there was no readily available and dissimilar method to which reference might be made.

With the use of cinchonine that objection disappears; in the acid attack, cinchonine serves as a means of separating dissolved tungstic acid from the acid liquors of the assay, and the weakness of the acid attack is thus counteracted. In addition, cinchonine may be used as an alternative to the mercury method in the determination of WO_3 in the methods based on an alkali attack.

The base cinchonine, a bulky white powder, is almost insoluble in water, but readily soluble in dilute HCl. A convenient strength of solution is 5%. It is prepared by weighing out a definite amount of the base, diluted with water and the minimum of HCl added until solution is complete: warming the solution assists the operation. When dissolved the solution is diluted to the required volume. The solution keeps indefinitely and 5 cc. is sufficient for quantities of WO_3 up to 100 mg. Quinine in the form of dichloride may be used and answers just as well.

AUCTION SALE

of

Valuable Graphite Property

Near Buckingham, Province of Quebec, Canada.

The undersigned will offer for sale by public auction at W. A. Cole's Auction Rooms, No. 63 Sparks Street, in the City of Ottawa, Canada, at 2.30 o'clock in the afternoon of the tenth day of September, 1918, the property known as the "Walker Graphite Mine," in the Township of Buckingham, comprising about 1250 acres of land, held in fee simple. The property is situated about six miles from the town of Buckingham, on the Canadian Pacific Railway, between Montreal and Ottawa, and less than ten miles from the landing on the Ottawa River. The quantity of ore is practically inexhaustible, and the mining facilities are exceptional.

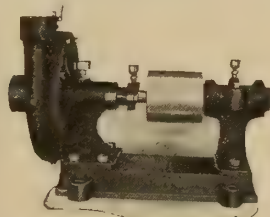
The buildings consist of refinery, engine and boiler house, manager's dwelling, foreman's dwelling, and other buildings. The lands are well timbered and contain ample supplies for mine purposes and fuel. The right to cut basswood until the 1st day of March, 1919, has been sold.

A large quantity of machinery, plant and tools on the property will also be sold as a separate lot. Both sales will be subject to reserved bids.

Applications to inspect the property may be made to Mr. Sam. Devine, Buckingham, Quebec, Canada, and further particulars may be obtained from

M. J. GORMAN, Vendor's Solicitor,
Union Bank Building,
Ottawa, Canada.

W. A. COLE, Auctioneer



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SMART-TURNER PUMPS

There is a solid basis for satisfaction in the high standard of our product.

The Smart-Turner Machine Co., Ltd.

HAMILTON

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HOISTS, BUCKETS, CARS

MINE HOISTS, made in 7 sizes, from 10 to 50 horse power, and with any diameter of drum up to 48 inches at bottom of flanges.

MINE BUCKETS, made any size, shape, or style, to suit the customer.

MINE CARS, made in a large variety of sizes and styles to suit the particular work for which they are intended.

MINE CAGES, with safety devices, made to order, to fit the customer's shaft.

MINE SKIPS, self-dumping and self-righting, made in a variety of sizes and styles.

Our large catalog describing all of above is yours for the asking.

Marsh Engineering Works, Limited, Belleville, Ontario

Established 1846



Peterson Lake .....	.09½	.10
Right of Way .....	.03	.03½
Seneca Superior .....	..	.02
Silver Leaf .....	.01	.01½
Temiskaming .....	.29½	.29½
Wettlaufer .....	.04	..
Mining Corporation	3.00	3.30
Provincial .....	.50½	.51½

NEW YORK MARKETS.

June 24th, 1918.

Connellsville Coke—

Furnace, †6.00.

Foundry, †7.00.

Crushed, over 1-inch:

Beehive, †7.30.

† Fixed under Lever Act.

Straits Tin, spot, f.o.b. none offering.

Copper—

Prime Lake, *23.50.

Electrolytic, *23.50.

Casting, *23.50.

Lead, Trust price, 7.82½.

Lead, outside, nominal.

Spelter, prompt western, shipment, 8.57½.

Antimony—

Chinese and Jap, 13.12½ to 13.37½.

Aluminum—Government price, carload lots, f.o.b. plant, effective June 1st:

98-99% Virgin, 33.10.

98-99% remelt, 33.10.

No. 12 Aluminum Co., 33.30.

No. 12 remelt, 33.30.

Scrap aluminum, 33.10.

Powdered aluminum, 65.00 to 70.00.

Metallic Magnesium—

99% plus, 1.75 to 2.00.

Nickel—Ingot, 40.00.

Shot, 43.00.

Bismuth, nominal, 3.50.

Cadmium, nominal, 1.40 to 1.50.

Palladium, 135.00.

Quicksilver, nominal, 118 to 120.

Platinum (pure), *105.00.

Iridium, *175.00.

Cobalt (metallic), 2.50 to 3.50.

Tungsten—

Scheelite—Best grade, 24.00.

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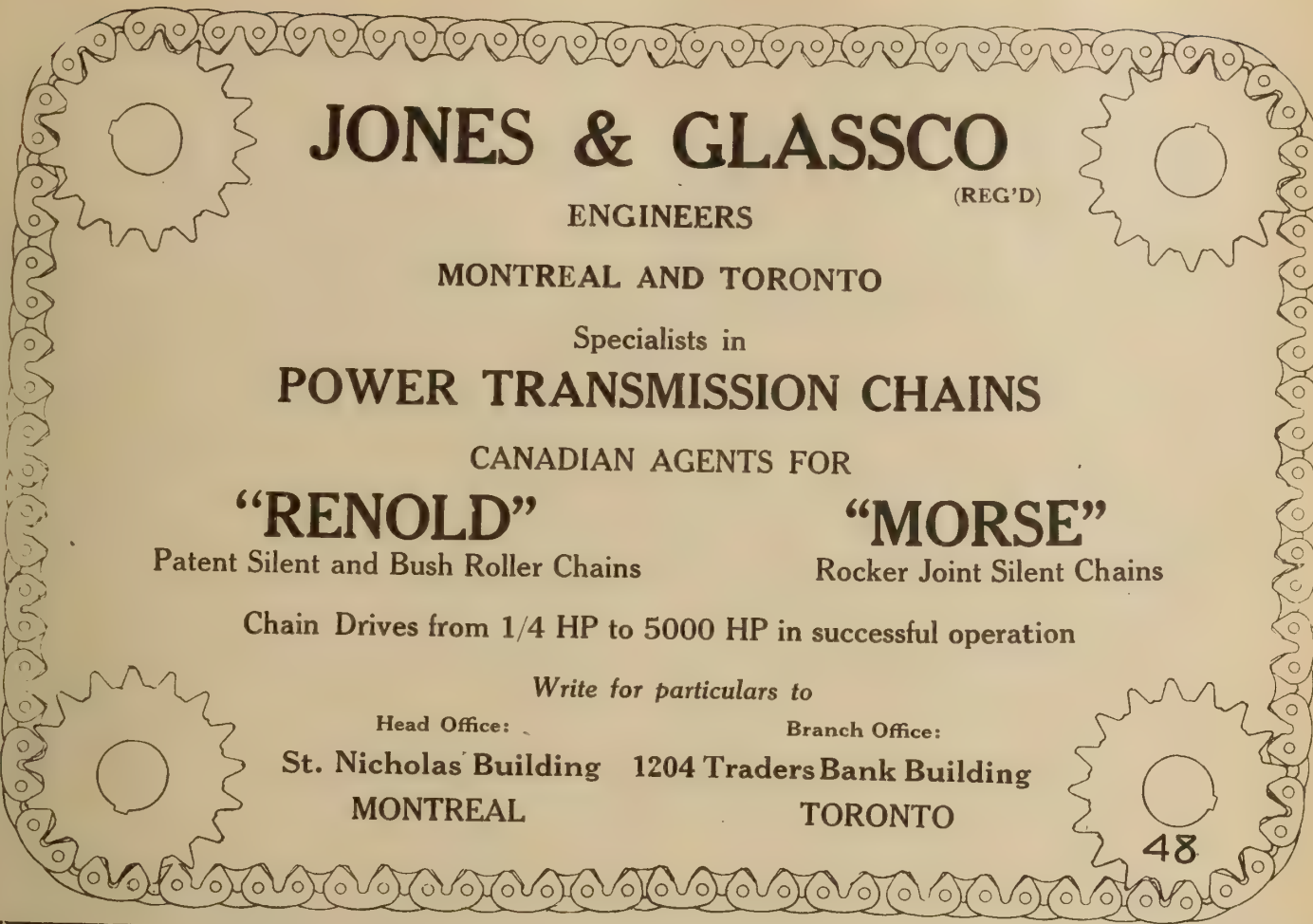
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- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
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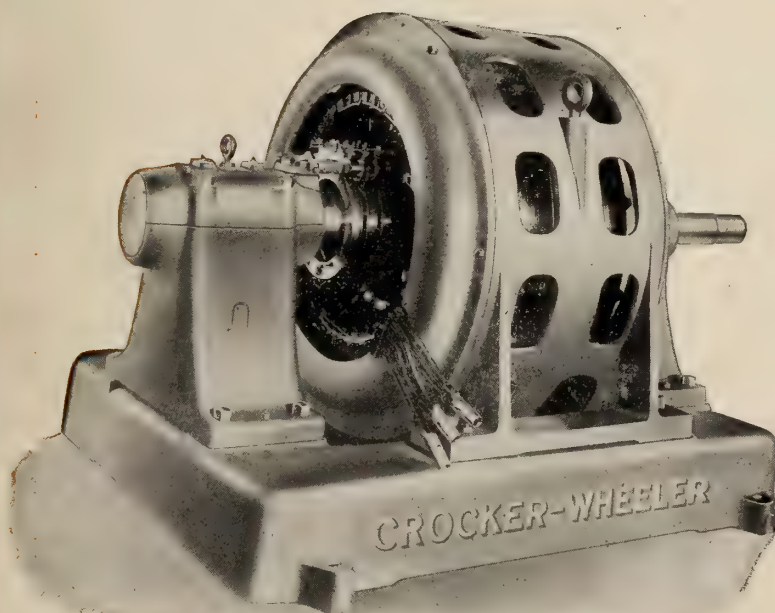
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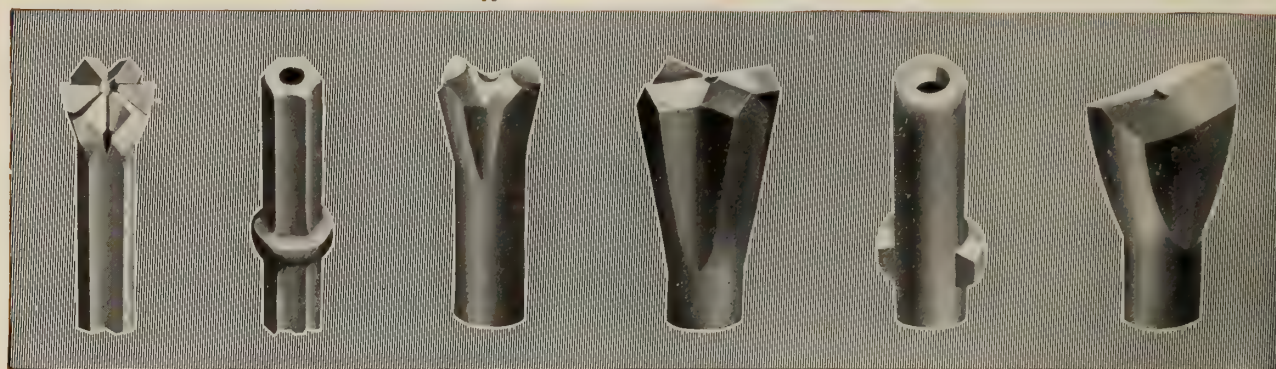
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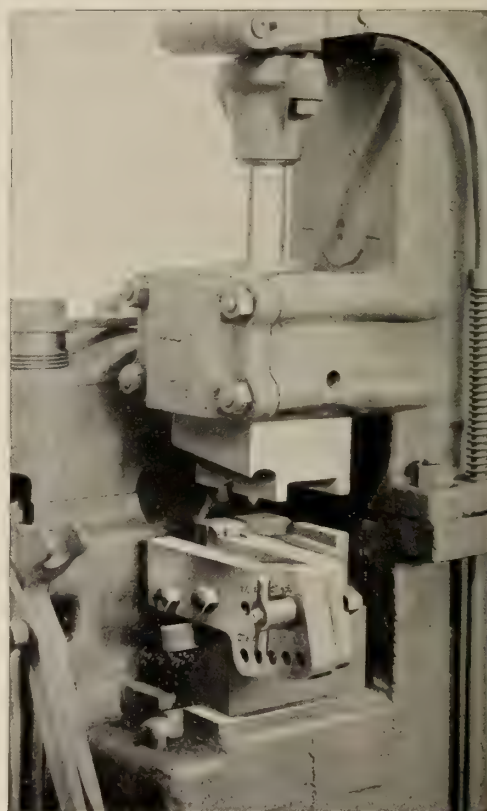
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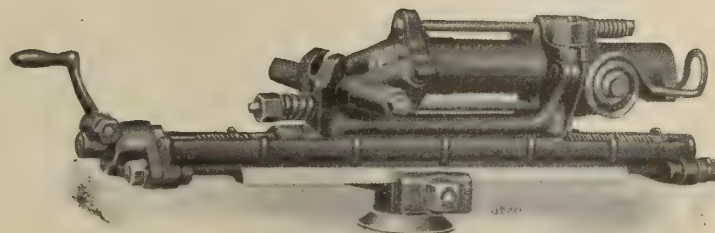
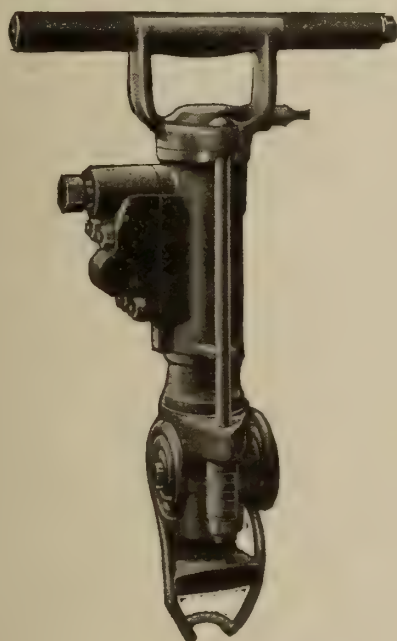
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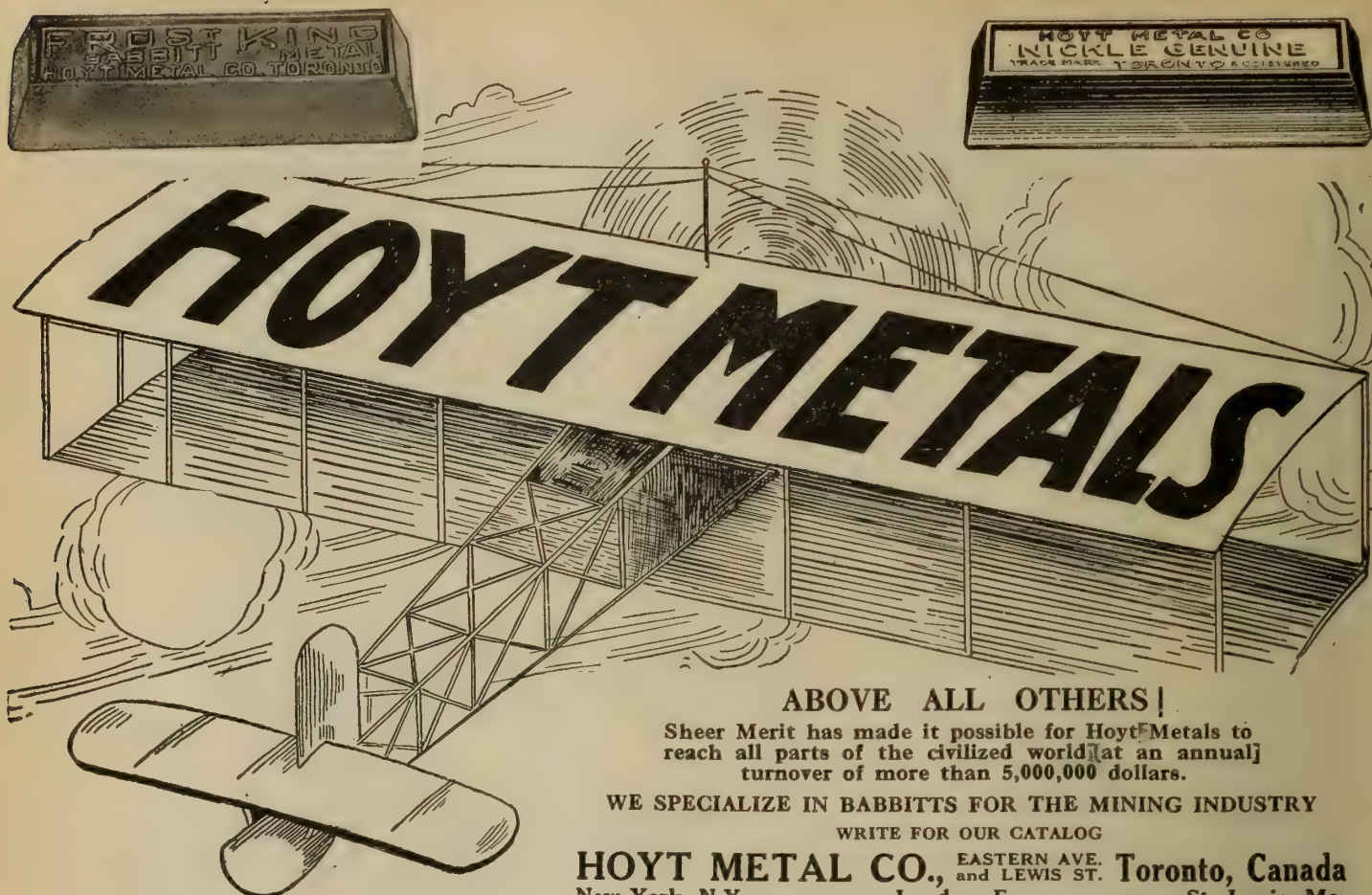
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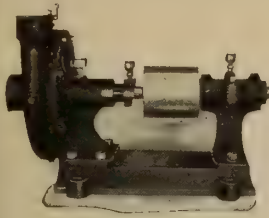


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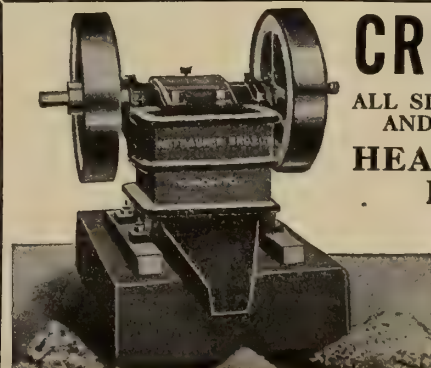
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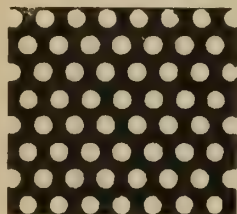
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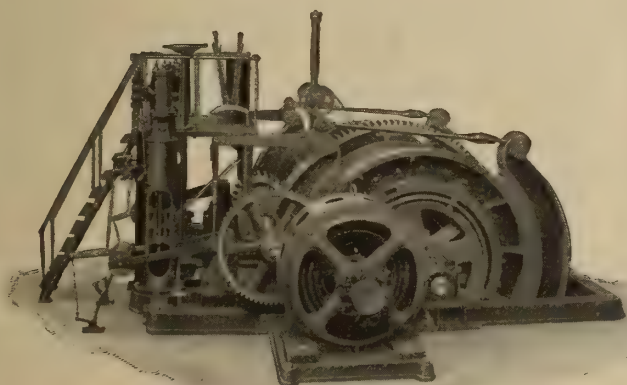
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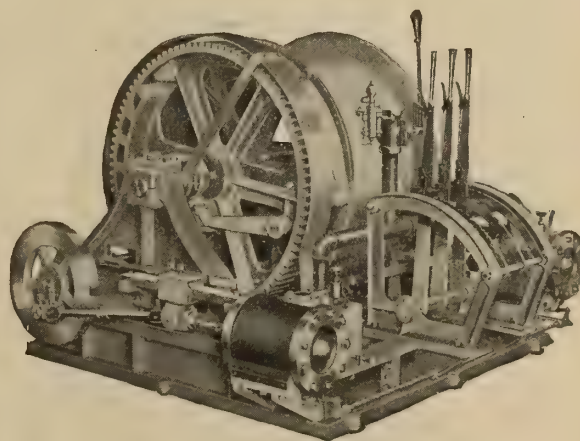
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

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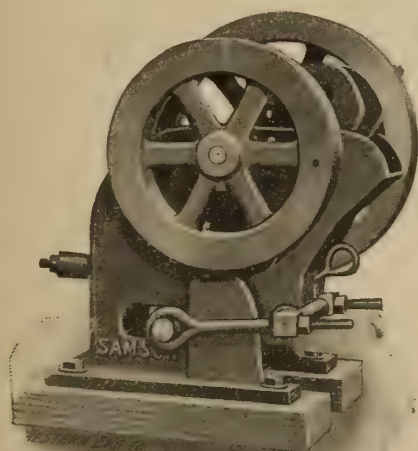


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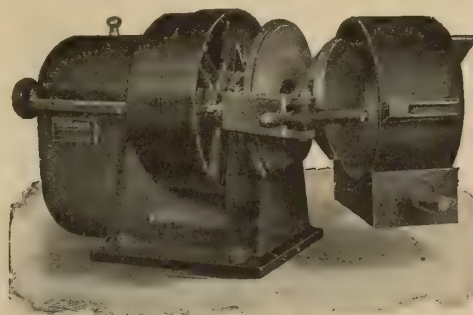
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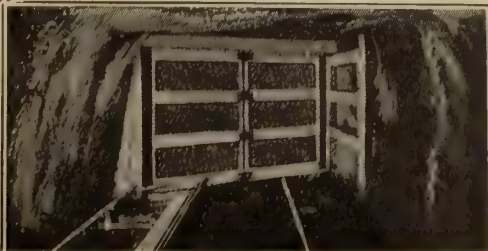
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, July 15th, 1918.

No. 14

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

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Editor: **REGINALD E. HORE, B.A. (Toronto).**

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At a recent conference with mining engineers in New York, Mr. R. V. Norris of the fuel administration said in regard to the coal shortage that the situation is serious and is going to continue to be serious. With a shortage of labor amounting to 30% production has been increased 20%; but greater increase is necessary. The railroads have done well and Mr. Norris stated that "the zone system of distribution has saved us 160,000,000 car miles a year."

The labor problem in every producing district is a serious one; but it is folly to attribute all our troubles to labor shortage. As has been shown by the coal operators in Western Canada, our coal mines could produce a much larger tonnage if the demand warranted continuous operation throughout the year. While men and machinery were idle at Western Canadian mines last summer, the Canadian railroads were busily hauling Pennsylvania coal westward to Winnipeg and beyond. This state of affairs has very properly been exposed and has resulted in action being taken by the

DANGER OF COAL SHORTAGE IS NOT YET REALIZED.

There has been a complete failure on the part of the public and (as the Government of any democratic country merely reflects the opinion of the general public) there has also been a failure on the part of the authorities to realize the fundamental importance of coal in the prosecution of the war. Great Britain, the United States and Canada all show a falling off in the production of bituminous coal this year as compared with 1917, and what the coming winter has in store for us it is not pleasant to contemplate. Governmental action so far has consisted in suggesting increased production through increased efficiency of the remaining workers, in the greater use of mechanical appliances, and in the adaptation of the transportation facilities to the seasonal demands for coal, with particular reference to the needs of domestic consumers. All these measures are but palliatives, and no one seems to have had the courage as yet to tackle the root of the trouble, which is the shortage of men digging coal at the face. There is the neck of the bottle; there is the true restriction and limitation of bituminous coal production which threatens worse troubles next winter than were experienced last winter.

Under the circumstances it would be amusing, if it were not so serious, to read of discussions in Winnipeg and other Western cities as to the hardships inflicted upon the householder by enforcing the substitution of soft coal for anthracite. The Winnipegger will be glad to get anything that will burn next winter. The Fuel Controller is doing all he can to alarm the people of the western cities as to the necessity to get in their winter coal during the summer, but apparently some wise people think the Fuel Controller is a bugaboo. It is not possible to exaggerate the dangers of disregarding the Fuel Controller's advice in this matter, nor is it possible to overstate the importance of the collieries of the Canadian West raising every pound of coal that can be mined before the frost comes.

In the recent registration questionnaire it was evident that the Government realized the importance of farming, but what will be the advantage of raising wheat and other produce if there is no coal to transport it? Coal is the first need of modern warfare. It comes before man-power, food production, munitions or anything else, because without it all these other departments of war's varied needs are immobilized or non-existent. As Lloyd George has inimitably phrased it, "coal is the paramount lord of war." It is strange when the leader of our democracy expresses so clearly the place of coal to-day that so little attention has been paid to the increasing of its production, and that the authorities have been principally exercised over the suffering of the individual householder that arises from

but when coal production declines to a point where it threatens the production of war munitions and hampers the movement of troops and munitions, it throttles all national endeavor at its source.

Coal-mining to-day is not an industry within the general acceptance of that term. It is a department of national defence. Without it, the presence of our troops on the firing line cannot be. Why, then, should the production of coal, of all things, be distinguished by a decline that other and less essential occupations do not show. Steel, wheat, men, ships, guns, shells, money, all these things, and many others are but a transmutation of coal, merely the finished product of materials that have been mined, assembled, and manufactured with the help of coal. Coal is basic, fundamental. When will the fact be realized?—F. W. G.

THE GOSPEL OF UNITY.

One of the most notable figures in America to-day is Mr. Samuel Gompers, President of the American Federation of Labor. Mr. Gompers before the war was an extreme pacifist; but he quickly woke up when Germany set the world afire. Since then he has helped citizens of the United States to realize the dangers that confronted them, and he will always be honored for his part in preparing his country for the battle for freedom, which his vision enabled him to see in what, to many of his fellows, seemed to be merely a European quarrel. Mr. Gompers visited Canada recently and while here he made it clear that he has not been fooled by the sophistry and pretences of the Socialists. In view of what he has done and is doing his words have considerable weight and his appeal for unity was well received throughout the country. He closed his address to the Canadian Club with the following words:

"I ask and appeal for the unity of the people of Canada. I cannot find words to express to you my appreciation of the magnificent courage, of the wonderful contribution which the manhood and womanhood of Canada have given to this great cause voluntarily. I appeal for still stronger and greater sacrifices if needs be. I am making the same appeal to my fellow-countrymen in the United States. I wish that I could go abroad to my fellow-workers of Great Britain and of France. I wish that I could go to the front and give a word of cheer and heartening to the fighting boys there. But I am advised that the best service I can give is to remain at home and occasionally go to the men who are in accord with us and help to spread the gospel of unity of spirit and purpose, and solidarity, and sacrifice, in order that we shall not fail; and we dare not fail.

"The clock has struck. The time is tolled. Every man to his post of duty, where he can give the best possible service for the common cause. Men must fight. The men at home must sacrifice—must work, give service, buy bonds, spare all that can be spared, that our

fighting men over there shall be supplied with everything that they may require to put up the fight that shall win. It is either to buy bonds and pay taxes for freedom, or to pay tribute and indemnity for the Kaiser and unfreedom—that is the choice. And for us, who not only understand what freedom means, but who have grown out of the loins of men whose forbears were the men who fought for freedom—for the men of to-day who have freedom, enjoy freedom and practise freedom, there is no choice. Men of Canada, fight on, carry on, and victory will be yours and ours, for the whole world and for the generations yet unborn."

B.C. LEGISLATURE MAY RE-ENACT LEGISLATION RE COAL LANDS.

Discussing the disallowance by the Dominion Government of the Provincial Statute giving the early settlers within the Esquimalt & Nanaimo Railway Belt the right to apply and, their claims on examination proving sound, to receive Provincial title to the coal rights in their lands, Hon. John Oliver, Premier of British Columbia, recently stated that he saw no reason why the Provincial Legislature, at its next session, should not be asked to re-enact the legislation. This is taken to mean that the Province will insist on its power to give the settlers the privilege indicated. It also means that the present British Columbia Government is likely to maintain the principle of Provincial authority in the case in question. The issue is one of vital import not only to the settlers, whose coal lands are at stake, but as well to the Granby Consolidated Mining & Smelting Co., which holds Provincial title to valuable coal areas, and to the Canadian Collieries (D) Ltd., which claims title to all the non-alienated coal lands in the Railway Belt by virtue of the terms of the subsidy granted to the E. & N. Railway Company in 1884.

B.C. MINERAL ACT NOW APPLIES TO TUNGSTEN, ETC.

The Mineral Act of British Columbia has been enlarged by Order-in-Council to apply to tungsten, fluorine, vanadium, radium, and uranium, or any combination of these elements "with themselves, or with any other elements." This action was taken by the Provincial Government on recommendation of Hon. Wm. Sloan, Minister of Mines. Without exception, these are minerals the importance of which has been accentuated by the war, some to a greater extent than others. It having been brought to the attention of the Department of Mines that there are occurrences of fluorspar and of scheelite in British Columbia it was decided to lose no time in bringing these and other minerals, heretofore outside the scope of the Act, but imperatively needed in the manufacture of munitions of war, within its provisions. It may be stated by way of explanation that the Provincial Mineral Act, and its definition of mineral, were drafted twenty years ago when the minerals in question were unconsidered so that they have been in the anomalous position of being unstackable under the Act in a legal sense, although common sense and the necessities of the times demanded their inclusion. Incidentally it is pointed out that the British War Board has asked the Canadian Government to produce as much vanadium as possible, while the need of tungsten also is great. Not an inconsiderable market for fluorspar exists at the smeltery of the Canadian

Coal Production in Nova Scotia During the First Half of 1918

By F. W. Gray.

The production of coal during the first six months of 1918 in Nova Scotia shows a decline from the outputs of the corresponding period of 1917 of approximately 330,000 tons. The falling off is principally to be found in the production of the larger coal companies and it is slightly offset by one or two increases. The net result, however, is a decrease. In the writer's review of the Nova Scotia coal trade for 1917 it was forecasted that the yield of 1918 would in all probability show a decline from 1917 of 350,000 tons, and unfortunately this forecast has been almost realized in the first half of the year. During the next six months, barring accidents, it is not to be anticipated that the rate of decline will be quite so rapid as it was during the first six months, but no increase can be expected, and a further diminution of the rate of production is only too probable. It would look as if the 1918 figures would be about 400,000 tons below those of 1917.

Weather conditions in January, the explosion at the Allan Shaft Colliery, and some very minor labor troubles have partially caused this falling off from last year, but the real and important reason is the shortage of underground workers, and more particularly the insufficient number of men qualified to work at the coal face.

It has not been fully realized, how specialized is the occupation of the workman who "digs" coal, nor how largely the drain of voluntary and draft enlistments has fallen on this class of underground worker. In the organization of a colliery there are men who are classed as producers, and other men who are classed as "non-producers." The use of this last-named term does not imply any lesser importance of the work to which it is applied, but it is very essential that the respective proportions of producers and non-producers should be correct. Enlistments have taken away an undue proportion of the producing class, and while some readjustment is possible by transferring men from the non-productive classes to the productive class, this readjustment can only have a very limited range, as a large part of the underground non-productive class, and practically all the surface workers are unfitted for work at the coal face, either by being too young or too old, or by physical inability and in some instances by a distaste for the work of the actual miner. As the producers dig the coal, and the non-producers handle and prepare it for market, it is evident that the output of coal is limited and controlled entirely by the available number of producers. If all these men were taken away there would still be a very considerable number of workers left at the collieries, but there would be no coal for them to handle.

The disproportion between the respective classes has now become so great, that it can only be overcome by closing down some mines, and concentrating the workmen in the collieries selected for this purpose. If this readjustment is forced by the conditions existing, and it seems inevitable, then a certain number of older men, or physically ineffective men, will be thrown out of employment.

A statement issued by the Standard Silver-Lead Mining Co. in Spokane, Washington, indicates that that company operated at a loss of \$7,010 during the month of April, as against a profit of \$26,255 in the

EXEMPTION OF COAL MINERS CONTINUOUSLY EMPLOYED.

Coal mining is classified in Canada as a work of national necessity and coal miners are dealt with as a special class in the enforcement of the Military Service Act of Canada. The course to be pursued in regard to application of conscription to the miners has been a matter of serious consideration to the tribunals charged with power to grant exemptions, temporary and permanent, in British Columbia, and other western mining Provinces of the Dominion. The attitude assumed by His Honor Judge Thompson of British Columbia recently, may be taken as indicative of the generally accepted policy in this respect. In the Crowsnest Pass Coal District he was confronted recently with a blanket appeal for exemption for 36 men having the backing of the United Mine Workers of America and based on the contention that the appellants were engaged in a work of national importance. After hearing all the evidence as to the actual time being worked by each man, the amount of coal produced and the individual earnings, he allowed 31 applications for a limited period, renewal being conditional on their maintaining their average production of coal.

In giving judgment Judge Thompson established the following rules:

1.—In cases where I grant exemption it shall be conditional upon the appellant being continuously employed in his occupation, either that in which he is now engaged or some other occupation in the mine. Any person ceasing to work for more than 24 hours will be deemed to be not continuously employed, unless he can show some just cause or reason for his non-employment. This prohibition does not apply to recognized holidays and the holding of funerals.

2.—A lay-off of 24 hours without just cause or reason being shown shall not occur more than once a month. In case of illness a certificate signed by some medical practitioner must be produced within 48 hours and if demanded by the military or civil authorities produced and filed in the office of the chief of provincial police at Fernie, B.C.

3.—In the event of a strike or cessation of work by workmen other than exempted men whereby the latter are prevented from working, exemption shall cease, subject, however, to the provisions in rules 9 and 10. (These are certain rules laid down in the agreement subsisting between employer and employe in this District.) Judge Thompson here observes: "This may seem a harsh ruling, but it must be remembered that this appeal has been made by the United Mine Workers of America and it will be the duty of the officials of the brotherhood to see that no such strikes or cessations of work occur."

4.—No exempted man shall occupy an official position or carry on work which will necessitate his absence from work at his usual occupation in the mines. In the event of any person to whom exemption is granted desiring to change his employment from one employer to another he may do so upon application being made in writing to me and a certificate allowed by me.

5.—In the event of any dispute arising between the military authorities and any person to whom exemption is granted, or in the event of the military authorities drafting, detaining or arresting an exempted man for alleged noncompliance with these rules, or from any cause, the matter shall be brought before me as speedily

Mining in Kootenay, B.C.

By E. Jacobs.

With only half of the year gone, it is too early to venture an opinion as to what the value of the 1918 mineral production of British Columbia will be. There does not, however, seem to be any good reason to expect as large a total value for this year as there was for 1917; indeed, it will not be surprising to find that there will be a decrease that will show the optimism of some of those who have expected a larger value to have been without foundation.

It is quite likely the production of coal will be appreciably larger, but not of metalliferous minerals, neither placer nor lode. Nor is it to be expected that the total of dividend distributions of metalliferous mining companies will be as large as in 1917, for the amount declared for the first half of 1918 (\$1,345,796) is \$236,479 less than one-half of the total for 1917, which was \$3,164,550.

The chief metalliferous mining districts of the province are those of East and West Kootenay, Boundary, and the Coast. The outlook appears to be that so far as the Kootenay and Boundary districts are concerned, there will be a considerable decrease in the production of metals, except, perhaps that the output of zinc may be larger. If nothing shall happen to interfere with the continuous production of coal from Crowsnest mines, it may be expected that there will be an increase in the value of the year's output of non-metallic minerals that will in part offset the decrease in that of metals, but it is unlikely that it will wholly compensate for the latter.

Data relative to the output of all mines in Boundary and Coast districts is not usually obtainable until after the close of the year, so that any attempt to review conditions in those districts would, in the absence of such information, of necessity, be largely guess-work. It is believed, though, that there has been a falling-off in production in Boundary district; that there may be a similar result disclosed when the output of the metal mines of the lower Coast district shall be known, and that the upper Coast district will probably show an increase, which will be largely the result of the operations of the Granby and Surf Inlet companies. Without authentic data, though, to exhibit the actual position, the reference to the upper Coast mines should be regarded more as a surmise than as a statement founded upon definite knowledge of what the mineral production has been to date, and what it may be expected to be for the remainder of the year.

So much of the ore produced in Kootenay districts goes to Trail for treatment, that a far better idea of the situation can be given, for statements of the quantities received are published regularly, and these supply a basis on which to form an opinion as to whether there has been an increase or a decrease. The following summary review of ore receipts at Trail during five and one-half months of this year may be taken to indicate what the general results for the first half of 1918 have been:

Ore Receipts at Trail.—Ore receipts at Trail were not as large during the second quarter of the year as in the first similar period. As the figures available at the time of writing are only up to June 14, inclusive, complete comparisons are not practicable just now, but the following figures will be near enough to give a generally correct idea of the position in regard to

the quantities of ore received at the Consolidated Mining and Smelting Co.'s works at Trail. The monthly totals are as under:

Ore Received in 1918.	Daily Average.	
	Tons.	Tons.
In January	27,404	884
In February	33,989	1,214
In March	41,725	1,346
In April	37,039	1,235
In May	21,162	683
In June (two weeks only) . . .	8,222	587

The chief cause of the decrease was a considerably lessened production from the Consolidated Co.'s own mines. For instance, receipts of ore from mines at Rossland, by far the greater part of which comes from the Centre Star and Le Roi mines, owned by the company, averaged 770 tons a day for March and only 71 tons a day for two weeks of June; then East Kootenay mines, chief among which is the company's Sullivan zinc-lead mine, had an average of 225 tons a day for June against 347 tons for March, while Boundary mines shipping to Trail (the only important producer being the company's Emma mine) averaged but 38 tons a day in June as compared with 111 tons in March.

On the other hand, there was a distinct improvement so far as mines in Ainsworth and Slocan divisions are concerned. The total of Ainsworth mines for the months of February and March was 2,965 tons, while for April and May it was 5,004 tons. Slocan's total for February and March was 2,292 tons, and for April and May 2,884 tons, while for two weeks in June it was 1,368 tons. More ore come from United States mines, too, their February-March total having been 1,513 tons and that for April-May 1,731 tons.

It should be kept in mind that the foregoing figures do not include the whole production of the several districts included. While there may not have been any considerable quantity of ore shipped elsewhere from mines in East and West Kootenay districts, it is well known to those familiar with local conditions that the chief sources of ore-supply for the Boundary district copper smelting works, at Grand Forks and Greenwood respectively, are the mines of the Granby Consolidated Co. and the Canada Copper Corporation, the former having four blast furnaces in operation and the latter one or two.

EAST KOOTENAY.

Only one mine in East Kootenay district other than those owned by the Consolidated Mining and Smelting Co., during the period under notice, made an output of ore worth mentioning, namely, the Paradise, in Windermere division, which shipped to Trail 1,352 tons out of a total from the district of nearly 43,000 tons. Several small mines together shipped 79 tons, but with the exception of that from the Paradise, above mentioned, the whole of the remainder was from mines of the Consolidated Co., in the proportion of about 530 tons from the St. Eugene and 41,000 tons from the Sullivan, the latter quantity being of zinc ore except as to 229 tons which was lead ore. From time to time newspaper reports have been published, making it appear that one or other of several properties in the three mining divisions comprising the East Kootenay district—Fort Steele, Windermere, and Golden divisions—

the fact remains that the combined output of all of them, exclusive of the Paradise, which was reopened last year after many years of unproductiveness, has not this year reached to 100 tons of product shipped, and this notwithstanding that there is now a railway running through the district from north to south—from Golden, on the main transcontinental line of the Canadian Pacific Railway Co., to that company's Crowsnest branch in the southern part of the district.

WEST KOOTENAY.

It has already been shown that Ainsworth and Slocan divisions of West Kootenay have in recent months made a larger production of ore, while Rossland's output has dwindled until the figures for June show a most serious decrease. Not that Rossland mines have become exhausted, but that conditions are so unfavorable at this time for continuing the mining of ore in which the chief valuable content is gold that it has been decided to suspend for the time the production of such ore at the larger mines of that camp. Dealing with the several mining divisions separately the following comment is made:

Ainsworth.—Monthly totals of output in 1918 of mines in Ainsworth division, that is of ore or concentrate shipped to Trail, are as follows: For January, 584 tons; February, 1,319 tons; March, 1,646 tons; April, 2,255 tons; May, 2,749 tons; June (two weeks only), 963 tons; total to June 15, 9,516 tons. Of this total, about 5,200 tons was from the Consolidated Co.'s mines—from the No. 1 mine nearly 4,800 tons, and from the Highland 400 tons. The New Canadian Metal Co.'s Bluebell Mine, situated near the eastern shore of Kootenay lake, opposite Ainsworth, shipped about 2,700 tons of oxidized lead ore taken from a deposit opened between the surface and the deeper workings. The Florence Mining Co., operating on the west side of the lake, about two miles north of Ainsworth, shipped 680 tons, probably for the most part concentrate. The Bell, in the western part of the division, made an output of 255 tons of zinc ore, and there was shipped to Trail from the old dump of the Montezuma, on the south fork of Kaslo Creek, 106 tons. Seven other properties were shippers, with a combined output of nearly 300 tons; among them the Cork-Province group which is stated to now be better equipped for concentrating its lead-zinc ore and for maintaining an output.

Slocan.—Monthly totals of ore and concentrate, both lead and zinc, received at Trail are as follows: For January, 712 tons; February, 1,717 tons; March, 575 tons; April, 1,295 tons; May, 1,589 tons, and June (two weeks only), 1,368 tons; total, 7,256 tons. The larger shippers were the Standard, more than 3,000 tons; Surprise, nearly 1,200 tons, and Lucky Jim, between 1,500 and 1,600 tons. No information has been obtained as to what quantities the Standard and Surprise shipped to the United States, but since ore was received at Trail from the former during only three months of the half-year and from the latter only two months, it is thought that the figures just given represent only a part of the output of concentrates from the mills of those mines, respectively. The greater part of the ore and concentrate from the three mines mentioned had zinc as its chief marketable content. Quite recently it was announced that production had been suspended at the Lucky Jim mine, owing to expiry of contract previously in existence with the Consolidated Co.

In all there were nineteen shippers from Slocan district to Trail during the half-year, but only three, in

addition to those already named, made an output in excess of one hundred tons; these were the Galena Farm and Lucky Thought, both in the neighborhood of Silverton, Slocan Lake, and the Rambler-Cariboo, in the eastern part of the district.

Late news concerning Slocan mines includes the information that another important shoot of silver-lead ore has been found in the Standard mine, which for several years was the largest producer of silver-lead in the district; that there has been a similar recent experience at the Rambler-Cariboo mine, and that the newly-organized company which has acquired the Slocan Star mine has commenced development work in the lower levels of that mine. The Galena Farm mine is expected to keep up a steady production until weather conditions in the winter shall again bring about a suspension of operations.

Nelson.—This division continues disappointing so far as ore-production is concerned, its total shipments in 1918 to date to Trail having been less than 1,400 tons. As more than 800 tons of this quality was from the Consolidated Co.'s Molly Gibson mine, and 170 tons from the Monarch, near Beasley siding, it will be seen that the large area of country in the division south of the Kootenay river, with a total of less than 350 tons shipped to Trail, of which 319 tons was lead ore from the Emerald mine, near Salmo, has done very little in recent months to add to the mineral production of the country. It may be that the Yankee Girl, near Ymir has been shipping to other smelting works, but with that possible exception there does not seem to have been much, if any, ore mined outside of the comparatively small quantity received at Trail. It is not surprising that the several gold mines about Nelson, and in Sheep Creek camp, have not been producers, but there are copper properties in the neighborhood of the city from which an output was looked for. Reports have been published making it appear that more zinc ore had been opened in the Hudson Bay mine, near Salmo, but no particulars of results have been received for inclusion in this review. Little is heard now of molybdenite, discovered several years ago in the southern part of the division and for a time stated to be important. Generally, productive mining in Nelson division seems to have been at a low ebb in the first half of the current year. Nor does there seem to have been any important progress made toward the utilization on a commercial scale of the electrolytic zinc process at Nelson of which much had been heard prior to 1918.

Rossland.—There is little to add to that already written concerning mines in Rossland camp, where the Consolidated Co. is now making only a small production. The Le Roi No. 2, Ltd., however, is keeping up its output, having sent to Trail about 8,150 tons of ore in five months of 1918, which compares with a little less than 11,000 tons during the whole of its fiscal year ended September 30, 1917.

It is of interest to note that Mr. J. J. Warren, managing director of the Consolidated Mining and Smelting Co., was lately reported by a Vancouver newspaper to have stated that only development work was being done in the company's Rossland mines, with about 150 men employed. The newspaper report continued: "When asked if the provincial taxation legislation had had anything to do with the closing of the Rossland mines, Mr. Warren said there had been some talk about this, but the decision to suspend shipment of ore from the Rossland mines had not been influenced by taxa-

tion legislation, but was because operating costs had increased more than enough to wipe out the profit margin on gold-mining under present abnormal conditions and there had not been any appreciation in the value of gold. When normal conditions shall have returned, Rossland mines will be able to ship large quantities of ore with a fair margin of profit. The increased cost of coal and coke alone for each ton of ore treated was approximately 60 cents. Steel had doubled in price, powder nearly so, and labor costs had also gone up. The result was that a gold mine was now about the worst kind of mining asset for a company to possess."

Other Camps.—There is little productive mining going on in other West Kootenay camps, from the whole of which not much more than one hundred tons of ore has been received during this year. Several small properties in Arrow Lake division, others in Trout Lake, and still others in Lardeau, have sent small lots of ore to Trail, while in all three divisions some development work has been done. Now and again a report is published of something being done in Revelstoke division, but the only property in that part of the district that was among last year's shippers is not on this year's Trail list.

Upper Coast District of British Columbia

The British Columbia Department of Mines recently published a bulletin entitled "Preliminary Review and Estimate of Mineral Production, 1917," in which was printed preliminary reports on the six Mineral Survey Districts into which the Province has been divided. That on District No. 1, by Mr. Geo. A. Clothier, resident engineer, with headquarters at Prince Rupert, follows:

District No. 1 is the old Cassiar District and includes seven Mining Divisions of the Province, namely, Bella Coola, Queen Charlotte, Skeena, Portland Canal, Atlin, Stikine, and Liard. It has 300 miles of direct coastline, from Seymour inlet to Portland Canal, which latter forms the south-eastern boundary between Alaska and British Columbia. In this distance there are hundreds of islands, and thousands of miles of canals and inlets cutting into the Coast range, affording the best possible conditions for prospecting. Shipping facilities and transportation are, of course, ideal, and it is because of these natural advantages that the large mining companies operating on the Coast have engineers in the field in search of suitable properties. The prospector on the Coast has therefore the double advantage of comparatively easy prospecting and a ready market for a prospect of merit.

The district, in 1917, produced about 830,000 tons of ore, of which amount, all, except about 1,700 tons, was treated at the Granby Company's smelter at Anyox; this company producing and treating from its own mines alone about 812,000 tons, which includes the low-grade quartz mined and shipped to the smelter for flux. The important new shipper added to the list in 1917 is the Belmont-Surf Inlet Mines, Limited.

Bella Coola Division.

The Bella Coola Division has had no mining outside of a little prospecting and the recording of about forty mineral claims. The only portion of the Division which I was able to visit was Seymour inlet, to look over some iron groups. I examined two properties and found some

good surface showings of fine, clean magnetite, well located for economical production and handling.

Skeena Mining Division.

The Skeena Mining Division has made an exceptionally good record during the year 1917, due to the very successful operations of the Granby Consolidated Mining, Smelting, and Power Company.

It has added one more producing property to its list in the Belmont-Surf Inlet Mines. This company has expended upward of \$1,000,000 in purchasing, developing, and equipping the quartz property on Princess Royal Island. The placing of this property on a shipping basis presented some difficult problems, and credit is due to the staff of the company for the installation of the up-to-date plant now in operation, and which will be dealt with more fully in a later report. The concentrator was put in operation in October, and to date the company has shipped to the Tacoma smelter 700 tons of concentrates, which will give returns of between \$90 and \$100 a ton in gold, silver, and copper value. With the additional tube-mill now being installed, the mill will treat 300 tons every twenty-four hours, producing between 800 and 900 tons of concentrates a month. The flow-sheet is partly water-concentration and partly oil-flotation, the latter using the Belmont-Jones type of machine. The saving is from 92 to 94 per cent. and will be improved.

The company has also under option and development a very promising-looking property, with similar ore to and adjoining its present holdings. The management expects to ship a total of 1,700 tons this year.

There are several groups of claims in the immediate vicinity on which there are said to be fine surface showings, but which I was unable to examine on account of the heavy snowfall.

I have been reliably informed that up Khutze, Aaltanhash, and Klekane inlets, off Graham channel, on the mainland, are several promising surface showings.

About twenty-five miles from Hartley bay, on the north-west side of Douglas channel, the Drum Lummon Copper Mines, Limited, a Vancouver company, is developing a property which shows bunches of high-grade copper ores of chalcocite, covellite, and bornite in quartz, which itself lies in more or less regular bunches, replacing the granite on either side of a fracture-zone through it. They have installed a very serviceable small equipment of gasoline-engine and compressor which will run a couple of hammer-machines, also an engine and fan for ventilating. Development to date consists of 365 feet of crosscut tunnel to the vein and 59 feet beyond, with 104 feet of drifting on the vein. The drift shows continuous ore for the whole distance, pinching in places to a foot in width and widening to 10 feet. The face at present looks very promising indeed, being 10 feet in width of quartz containing disseminated high-grade copper sulphides which would concentrate probably 10 into 1, making a very high-grade product. I was unable to examine the surface on account of the snow. The Mines Department has assisted the company to build a wagon-road from the beach to the mine, a distance of about a mile. The property looks very promising and is just at the critical stage now, where the next few thousand dollars can be spent to the very best advantage. The company has just sent a trial shipment of about 8 tons to the smelter, of ore sorted from development work.

MILITARY GAS MASKS ARE NOT SUITABLE FOR MINERS.

Mining men who are familiar with the oxygen mine rescue apparatus used by rescue men at mine explosions have been making inquiries of the U. S. Bureau of Mines, Department of the Interior, as to whether or not the military masks worn by the soldiers as a guard against poison gas attacks would not be serviceable at mine disasters. The military mask is so much lighter in weight and therefore so much easier carried that the miners are wondering if they cannot be used instead of the heavier oxygen mine rescue apparatus.

In answering queries of this character Mr. George S. Rice, Chief Mining Engineer of the Bureau, has the following to say:

"Military gases which may be discharged from pipe, or in later usage through the agency of shells, are poisonous in character, and perhaps may be immediately irritating to the eyes and skin. On the other hand, these gases being discharged in the open air are rapidly diluted so that high concentrations are generally only momentary except in dugouts which must be cleared by fanning out. Moreover, there is never a material deficiency in oxygen.

"The mine atmosphere after explosions or during fires contains the highly poisonous carbon monoxide gas, one of the most difficult gases to absorb chemically, and may be in high degrees of concentration for a long period, and also, what is more important, there is usually so serious a deficiency in oxygen after explosions that even if there were no poisonous gas present a man could not live.

"It is self-evident, therefore, that the purpose of the military mask is to absorb the poisonous gases present and these gases are sometimes very complicated in composition and a great variety of them are used. The supplying of oxygen other than atmospheric oxygen is not necessary. On the other hand, the first requisite of the mine rescue apparatus which is used at the military front in tunneling operations compels the supply of sufficient oxygen, viz.: 20 per cent. of the atmosphere and the exclusion of high concentrations of gases. Hence the necessity of having the apparatus self-contained, shutting off all the external atmosphere.

"It may further aid in explaining the situation to state that very large numbers of the regular oxygen mine rescue apparatus are being used both by the enemy and the Allies in tunneling and contra-tunneling operations as well as other special purposes.

"A third service requiring special apparatus is the Aviation Service. There are no poisonous gases to contend with, but the need is for oxygen to supply the deficiency at high altitudes.

"It will, therefore, be seen that so far as mine rescue and mine recovery work is concerned it is idle to consider that the military masks could be used as a substitute; they are of no value for the purpose, although with certain changes a commercial form may be developed which may be adaptable for use in special gases or vapors in metallurgical plants. Mr. G. A. Burrell, of the Bureau is now working out the problem of such a commercial mask, but it must be understood that special absorbents will be required for special gases, which calls for a knowledge of the exact atmosphere in which the men who would use the masks would work."

MAY DEVELOP CHROMITE DEPOSITS IN B.C.

There are indications that some of the chrome deposits of British Columbia are to be developed, Walter

J. Nicholls and associates of Spokane, Wash., being authoritatively reported to have secured control of claims situated at Cascade, B.C. The property is reported to have been purchased after an examination and report by George Crerar, a mining engineer of Spokane. The chrome of Cascade has been the subject of report by the Provincial Mineralogist, the deposit to which he refers, which no doubt is the same as that in question, being within 4,000 feet of the C.P.R. and in the Grand Forks Mining Division. Of this, Mr. P. B. Freeland, resident engineer, said last year: "Little development done. Ore in lenses carrying 30 to 50 per cent. chromium. Worth investigation. Had 250 tons on the dump, and were trying to get permit to ship. Associated serpentine rock carries 3 to 10 per cent. chromium." In view of the rush call for chromite by the Imperial Munitions Commission, and the consequent increased interest in the mineral in the Province, it is interesting to recall that Mr. W. M. Brewer, resident engineer at Nanaimo, B.C., reported in 1915 that chrome ore exists on Scotty Creek, near Clinton, B.C. The claims, he said, had been staked but abandoned and then re-opened. Little development, however, had been done. Selected samples ran 33 per cent. chromic oxide. Some low grade ore might be concentrated, but development was not such as to admit of an estimate of the quantity.

BRITISH COLUMBIA MINING DIVIDENDS.

The five leading mining companies of British Columbia, according to an authoritative compilation, have declared dividends for the first half of the year 1918 as follows:

Granby Consolidated Mining & Smelting Co.	\$749,924
Canadian Consolidated Mining & Smelting Company, Trail, B.C.	523,872
Howe Sound Company (Britannia Mine)	198,415
Hedley Gold Mining Co.	96,000
Crow's Nest Pass Coal Co.	62,126

The Britannia mine, as represented by the Howe Sound Co., leads in the ratio of dividend to capitalization, its dividend rate being 5 per cent. per quarter, or 20 per centum per annum. Granby leads as the largest dividend paying mine in British Columbia, its dividends declared to date having aggregated \$10,198,895. Both Granby and the Consolidated Mining & Smelting Co. pay dividends at the rate of 10 per cent per annum.

The Molly Gibson-Burnt Basin Mining Company is sending supplies and men out to their property at Paulson with a view to putting the mine on the shipping list in the near future. For the present ore will be hauled over the wagon road three and a half miles to the railway. The formation and character of ore is similar to that of the Rossland camp, gold being the principal value.

At a meeting of the Board of Directors of the American Institute of Mining Engineers, it was decided to drop all enemy aliens from membership. The meeting, which was under the chairmanship of Sidney J. Jennings, President of the Institute, was attended by twenty-three of the twenty-five directors, among them the Chairman and four members of the Naval Consulting Board. The action of the Board of Directors is said to affect the status of twenty-one German scientists and one Austrian professor, who held either honorary or active membership in the Association.

Lessons From The War*

By Eugene Schneider.

I should have scrupled to accept the Presidency of the Iron and Steel Institute, aware as I am that my personal merit does not suffice to make me worthy of that very high honor, and that a far-distant residence renders it difficult for me to discharge the responsible duties of the office, had I not understood that, prompted by a sentiment for which I am deeply grateful, you wished, in selecting my person, to emphasize the absolute, hearty, loyal no less than thoughtful and resolute union existing between Great Britain and France.

Your kindness has given voice to the thoughts that we share in common. United by mutual sacrifices, bereavements and hopes, we intend to remain undivided in victory. My hearty desire, as President of the Iron and Steel Institute, is, with the cordial assistance and support of both my predecessors and my colleagues on the Council, to draw still closer the economic bonds uniting our two countries; the unbroken development of such an alliance tending in the most efficient manner to disappoint our enemy in his insatiable lust of conquest.

Nor does it seem to me without profit, in order to prepare for the coming struggle, to seek even now in the tragic examples of the war for reasons and means of doing better than we have done hitherto.

Science and Industry.

Two years ago Sir William Beardmore told us, in his address, how the war had a long series of lessons to teach us, in the most varied provinces, ranging from ethics to politics and industry. In the last-named province, Sir William showed how scientific co-operation, that is to say co-operation between laboratory research and manufacturing development, is one of the questions most emphatically thrust upon us by the events that we have been witnessing, and one demanding as prompt as possible an answer, in view of our industrial destinies after the war.

I believe that the greater number of the industrialists interested in the manufacture of steel or any kind of manufacture in which the material used is steel or iron, on either side of the Channel, share Sir William's views. But the difficulty of the question certainly does not lie in the generalization of these views; it seems to me, on the contrary, to reside in defining clearly the connection to be established between two groups of men who, up to now, have had few direct relations; the scientists on the one hand, and the industrialists on the other.

In the definition we are seeking for, difficult problems of organization are involved; for a solution may be considered as satisfactory only inasmuch as it realizes a complete harmonious balance between the different forces which we are using to obtain the sought-for results. Some are connected with the efforts of individual enterprise; others are the outcome of collective action, duly disciplined and, as it were, codified, and of the rational use of habits and traditions. We have no right to neglect that inheritance of the past. We should, on the contrary, in rearing our new fabric, avail ourselves, to the best of our ability, of any material at hand, provided it be serviceable.

We must first make sure that our future organization is so skilfully contrived as to provide individual enterprise with an open field broad enough or, as a mathematician would say, with a high enough degree

of liberty. Industrial or scientific invention is, indeed, in almost every case, the product of a creative power in an individual endowed with active imagination. To quote an example, it is beyond doubt that we owe to the personal exertions of Henry Bessemer the manufacture of steel in a converter and also to those of Nasmyth (in England), and Bourdon (at Le Creusot), the invention of the steam-hammer.

However, science and industrial technique are both growing ever more complex. It is increasingly difficult, even for an exceptionally endowed mind, to store up, digest and finally use the mass of human knowledge contained to-day in one of the numerous branches that have sprung up on all sides out of the common stem formed by the discoveries of the scientists, engineers and industrialists of the later nineteenth century.

Our engineers, scientists and members of our industrial staff have less and less the possibility of getting at the knowledge of facts by direct observation and thus apprehending them in their reality; they must often needs accept ready-made doctrines and live in a world of theory. There lies the main danger, especially in a time such as the one we live in. The fate indeed of our industry depends on the right use of the "human material" we may have at our disposal, to the training of which we shall have to attend; and we must therefore solve, at the shortest notice, the most complex problems that have ever been set before man: I mean, we must discipline labor in both our countries, so that our different industries, at which war and the economic consequences of war have struck and will strike heavy blows, may recover their balance with the shortest possible delay; while we make sure in spite of that indispensable discipline and the extreme specialization it involves, that we are recruiting powerful individualities whose exertions are necessary to progress.

In that respect, the iron industries form the basis of the gigantic fabric we are to rear; they are, so to speak, the gauge of industrial prosperity in a country, since whenever industry expands there is a demand for plant, and recourse is always had to metallurgy to develop plant. I may add that metallurgy is also the protecting shield that allows our two nations to resist the onslaught of German imperialism, and that it plays such an important part in the tremendous struggle, that few people realize it exactly, outside those who are in familiar and everyday contact with the real facts.

Important Role of Metallurgy in the War.

Of course, almost everyone knows that the present war requires a far greater quantity of metal than any preceding one; but it seems to me that it may be interesting to enquire into certain of the more hidden causes of this new condition and into some of the consequences necessarily entailed, all the more so as this enquiry will provide us with concrete examples, calculated to expose the parts played on the one hand by scientific research and invention, and on the other by industrial organization.

It is certain that the expenditure of ammunition exceeded, at the very outset, all anticipations founded on comparisons with previous campaigns. This circumstance appears to be due to stable, unbroken fronts, rendered possible by the huge number of men in the field. Military operations, under those conditions, assume, with few exceptions, the character of a siege-war.

* Extracts from the Presidential Address, Iron and Steel Institute, London, May 2, 1918.

The two enemies invest each other, and can effect no very ample movement unless part of the continuous rampart they are besieging or defending be previously broken through. As that rampart is not a mere line of walled defences, but is constituted in fact by an extensive area where is to be found a sporadical system of great depth formed by tier upon tier of varied works and guns of all sizes, one may well understand that, to neutralize a sector in view of an infantry attack, necessitates the expenditure of a greater number of shells than when the object, as formerly, was simply to demolish or fire a few houses in two or three villages. Instead of the 20,000 gun-shots with which Napoleon won the battle of Wagram, or the 1,500,000 shells that the Siege of Sebastopol cost the Allies, we must fire to-day several million shells to drive the enemy a few miles back on a very narrow front.

This, after all, is due to the fact that the accuracy of our gun-fire, and the high power of our explosives, are held in check by an adequate organization of the shelters afforded to the infantry, the size of the targets being reduced to a minimum.

The principal cause, apart from the difficulty of finding the range, of the present huge expenditure of shells is that the increasing accuracy of our guns has not been sufficient to counterbalance the diminished vulnerability of the objects aimed at.

Our artillery engineers, left to their own inspiration, and confronted with this fact, have certainly been tempted to seek for the solution in an improvement in the accuracy of their guns.

The problem is of profound technical interest. But, before grasping the solution, how many varying factors must we take into account: the laws bearing on the combustion of gunpowder; the effect of priming; the transmitting of pressures in a gaseous mass in motion; the particular effects when the shell is near the muzzle; the effects of the flexibility of the gun and the gun-carriage; the varying resistances due to the varying directions given to the shell, etc.

The work may and must be done; but it will take up a considerable time, for how many erroneous theories will crop up in the minds of the enquirer before they hit upon the royal road leading to the desired result, that is to say, to the lessening of differences in muzzle velocity, angles of elevation, and disturbing motions in the projectile during its flight?

To a common-sense man it plainly appeared that to carry on such researches exclusively was out of season, and that we must provisionally admit, as a necessary fact, an expenditure of shells deemed until then impracticable, and find, in the use of improved methods of manufacture, the immediately indispensable resources.

New Metallurgical Plants at Creusot and Caen.

Accordingly, I resolved to build new metallurgical plants at Le Creusot and Caen, with the view of producing a considerable tonnage of steel projectiles in the form of rolled bars, and of transforming directly all or part of the bars into nosed and heat-treated projectile blanks ranging from the 75 mm. calibre upward (370, 400, 520 mm., or 15, 15.75, and 20.5 inch respectively).

No doubt such metallurgical plants, situated far from our mining districts of the North and of Lorraine, will suffer from certain industrial reactions when peace allows most of our ironworks in the East to begin to work again. But I thought it permissible to neglect those future difficulties, in order to contribute to the defence of our allied countries to the utmost of my

capacity. Moreover, I do not think it impossible that the metallurgical future of France will afford the means of procuring a satisfactory prosperity, not only to the ironworks working with the ores of Lorraine, but to such as receive their supplies from other districts of our country, provided, of course, that the manufactured products are adapted to local conditions of extraction, fuel, and motive-power respectively.

Together with other French friends, we proceeded to build powerful blast-furnaces, and steel works equipped with 60-ton open-hearth furnaces, and this effort has enabled us to provide our armies with the necessary projectiles, in spite of the enemy holding more than 70 per cent. of our iron and steel works.

A similar question is raised with regard to deterioration in the inner tubes of guns. The intense firing to which they are subjected more or less quickly erodes the junction cone and the grooves of rifling, so that the accuracy and range decrease in a continuous manner, and a gun is useless after firing from 10,000 to 2,000 shots, according as it is a small or large calibre gun.

The engineers and ballisticians have naturally sought to reduce the effects of deterioration by a study of the very complex causes, the temperature of combustion of the powder, the maximum pressure, the calibre, etc. But it is evident that, knowing so little as we do about these things, the solution of the problem remains remote, and that, had we managed by laboratory experiments, to fix upon a quality of metal capable of withstanding the special erosion of guns, it was practically impossible to make the guns in course of manufacturing benefit by the discovery. We therefore took for granted deterioration, and consequently provided for the manufacture of spare tubes of guns.

Does this mean that we systematically avoided research? Quite the reverse, but we began by tackling problems admitting of an immediate solution, so to speak, and among the latter, above all such as tended to increase production. I am convinced that such a policy will have to be pursued still more strictly after the war.

So we have built in France extremely powerful plants for the manufacture of cast-iron or open-hearth steel. The Caen blast furnaces are to turn out, per unit, 450 tons per day, whereas, before the war, out of 123 such furnaces at work in France, but a few could turn out 250 tons. My new steel-works at Breuil, near Le Creusot, are equipped with 60-ton open-hearth furnaces, whereas the 30 to 35-ton type was already considered as very powerful.

Moreover, we are endeavoring to manufacture special high grade acid open-hearth steel for aeroplane motors and more generally for machinery intended to bear very high stresses and the results hitherto attained show that success is ahead. It is in that direction that our laboratories are working. It is not a question of merely finding some new metal, as the result of the skilful alloying of iron and rare metals, but on the contrary we are studying means for controlling the open-hearth process as securely as the mere melting in a crucible.

It would be tiring to review here all the questions we are now asked to solve. Perhaps, however, we may be allowed to select two more instances, in illustration of our idea of the part to be played by the engineers whose exceptional gifts help our technique to progress.

The greater part of the steel-ingots we are to produce will go to the rolling mill for conversion into bil-

lets or merchant bars. Hitherto, the different operations in the rolling mill department, and in particular the drafting of grooves on the rolls, had been left to the care of men of experience, no doubt, but who were guided by empirical notions based a little on tradition and much on sentiment. The manufacture of projectiles showed us the benefit to be obtained by a thorough and scientific study of the problem of hot-drawing of blanks or slabs. It is enough to say, for instance, that, with a properly selected speed of rolling, section of dies, piercing punches, drawing rings and punches, we are able to draw in one heating the largest projectile (520 mm. (20 15/32 inches) Schneider mortar) and to use in the process half as much power as was formerly deemed necessary.

To realize such a reduction of power in the rolling-mill department is, from an economic point of view, extremely interesting, but it is necessary to study methodically all the phenomena taking place during the various stages of rolling at the cogging mill and finishing mill. We must acknowledge that engineers in certain countries, had, if not anticipated us (for research had begun at Le Creusot as early as 1899) at any rate got ahead of us. The work of some of them is certainly calculated to give a sound basis to a really practical study. It is necessary, if we wish the rolling-mill department to profit by it, for younger engineers, having the requisite scientific equipment and eager to solve an interesting industrial problem, to attack it without delay.

They have a starting point: the empirical rules of those that preceded them. These must absolutely be taken into account. They have at their disposal the means of measurement furnished by the electric motors of our mills and all our laboratory apparatus, pyrometers, extensometers, etc.; they must needs reach the goal.

When we represent, on a diagram, as functions of the number of passes, the values of the sections of the rolled product and of its chief sizes, we are often surprised that the points thus obtained do not form continuous curves, when we know very well that, special steel being excepted, the tenacity of carbon steel varies in a continuous manner as a function of the temperature. The simple readjustment of the curves thus obtained often conduces to a decrease in the number of passes, and to a better distribution of the power. It is obvious that the profit to be reaped from the study will be immediately felt.

Defective Heating is Inexcusable.

I should like to say a word about another problem of an industrial type destined to be solved by our most skilled engineers. It is that of heating: heating industrial furnaces, heating boilers. It is an extraordinary fact that the art of making a fire and turning it to a good use is still in its infancy and that our heating apparatuses are often very crude.

We know the laws of combustion, gasification, radiation and convection; but many builders of furnaces go on copying old models instead of investigating the working of their apparatus. How many times have we not heard that a cast of open-hearth steel had gone wrong because "the furnace was not properly heated."

I lay down as a principle that an open-hearth furnace should always work well. If the defect in heating is due to the choking-up of the regenerators, we must manage to get the dust to settle and allow, if necessary, the addition of heat over the top of the bath, with the aid, for instance, of oil-burners or any other process, such as the use of a cleaner of some artificial draught;

for how can we admit that we cannot provide against an inconvenience which has been removed elsewhere?

If the defect in heating is due to the exceptional poverty of the gas, we must dispose of the means to better it, and these are numerous. In short, a systematic study of steel-furnaces will certainly lead to the remedying of many weaknesses in design and construction so that we may control their working and be as sure of their temperature as a stoker is sure of the pressure of his boiler.

The metallurgical works of the future must no longer afford the picturesque but regrettable sight, still too frequent to-day, of a crowd of chimneys all emitting an abundance of black or white smoke. The latter is steam. Perhaps apart from locomotives, no engine should emit steam in the open; the recovery of the calories contained in waste steam expanded to atmospheric pressure and at a temperature of not more than 30° C., yields a power at least equal to that produced by the prime mover itself. This we have determined experimentally on the exhaust turbines driven by the steam winding machines in use in some of our collieries. Even the steam of our hammers can be utilized whenever there is a workshop with a large number of moderately-powerful engines.

The black smoke is the result of badly-constructed furnaces, or of insufficient discipline in the personnel of stokers. The latter may be remedied in a simple automatic way by the institution of a bounty system calculated according to the number of charges, as shown in the deprimometer. As to the building of furnaces, great improvements might be effected by the systematic application of a few well-known results of industrial physics. We may perceive, here, under one of its characteristic aspects, the question of "industrial output" as opposed to "mechanical output." In the greater number of cases, it is possible to represent by a figure the useful effect of some isolated engine or thermic apparatus; but the useful effect of a metallurgical plant is a function of a far greater number of variables, including at the same time measurable quantities of the physical order and "imponderables," such as the technical value of the personnel and their moral qualities.

The time is at hand when our works must yield their maximum useful effect, and, therefore, we should give all our attention to any loss, even those which formerly appeared negligible on account of their comparative smallness. Multiplied by the enormous tonnage of our future production, they will form a considerable total. For instance, the mere recovery of waste oil in a vast metallurgical works may give rise to a not inconsiderable profit.

Right Use of Sources of Heat and Energy of Each Country is a State Affair.

But those are the minor aspects, one might say, of the question. More exactly, the problem of the industrial output may be studied from different points of view, the first of which is certainly a right use of the sources of heat and energy at the disposal of each country. That is a veritable State affair, concerning the whole community. In particular, with regard to ourselves, France does not dispose of a stock of mineral fuel corresponding to her wealth of iron ore. In 1913, whereas 23 million tons of ore were extracted, her native coal mines provided only four million tons of metallurgical coke, which, together with three million tons imported coke, made up merely the seven million tons necessary to her production in cast iron (five million tons).

It behoves us, therefore, to cast up the account of our resources in hydraulic power, so as to reserve for metallurgical purposes the greatest possible part of our coal production. Those resources may even now be easily appropriated for the traction of trains and tram cars, lighting purposes, and the distribution of driving force over extensive zones, since a 60,000 voltage is in use, and one of 120,000 voltage will be so very soon. Whereas the water-falls now utilized yield only from 700,000 to 800,000 H.P., future plants should allow a yield, at low water, of a minimum of 4,500,000 H.P. And as 1,000 hydraulic H.P. economize per year 10,000 tons of coal, in round numbers, the profit to expect from those plants will rise to 30 million tons, that is to say, a figure approximating our total coal extraction before the war.

Metallurgical and mining industries are interested in this question not only indirectly in the way we have pointed out, but also directly, by the use of hydro-electric current to control engines and even to produce metal.

The engineer's task, as we conceive it, begins here in an endeavor to combine harmoniously the use of thermic power as produced by the blast-furnace and coke-ovens, and hydro-electric power; the latter having the defect of being transmitted by very long lines exposed to many risks. It will, therefore, be well to provide very powerful thermic generating sets, ready for running at a moment's notice, capable of carrying on the work in the chief departments, pending the time when the thermic emergency stations have brought up to a maximum figure their normal reduced power.

That part will devolve upon groups worked by Diesel motors of 2,000, 4,000 and even 6,000 H.P., the price of oil-fuel being, in that case, a negligible matter. We are studying in France such motors and their realization seems assured.

Direct Use of Hydraulic Power.

Hydraulic power will, in certain cases, be directly utilized in our metallurgical works, without previous electric transformation. Workshops turning out projectiles have already been equipped with hydraulic presses worked directly by water forced at high pressure through pipes. More powerful presses may be worked in a similar manner, and even rolling mills might be driven by high-pressure hydraulic turbines, transmitting their energy, in the case of reversible mill engines, through the medium of a Föttinger transformer. May I recall here that a similar installation was realized by us several years ago at the Terni steel works for the manufacture of armor-plate (the power-transformer being electric).

The Electric Furnace.

The electric blast-furnace is not yet widely used in industry, but the development of electric furnaces destined to the production and refining of steel is certainly assured, especially in works using hydro-electric current as motive power. It is likely that various combinations of the electric furnace with the Thomas converter or the basic open-hearth steel will in future be the characteristic feature of that special iron metallurgy which is the necessary consequence of a dual source of heat. It will be the topography of the region or more exactly the place of the works on the "electric map" of France that will determine the proportionate demand to be made from either of the two sources.

Those are entirely new vistas opening up before our engineers. Nor should they, on that account, forget the questions of internal organization, more immediate and more varied in their form.

Union of Empirical Knowledge and Scientific Research.

Some say pure science is disinterested, or, in other words, indifferent to results; that its goal is the truth, the pure, simple, naked truth, and that it is pursued for the pleasure of the pursuit; like a sportsman who enjoys the pleasure of a day's shooting but who is indifferent to the game he bags.

This is perhaps exaggerated. At any rate, the aims of the metallurgist are more practical; he too aims at scientific truth, but a truth which can be applied to some useful end; he is not like the pure scientist, all indifferent to the game he bags. I am convinced, also, that in no other branch of industry can the union of empirical knowledge and scientific research be attended with better results than in that of metallurgy.

The opinion is no doubt excessive. For my part, I am inclined to think—and I believe I have shown you on what facts my opinion is grounded—that our metallurgical industrialists can derive much profit from scientific research, on condition that the questions are stated and treated in the proper manner—that is to say, in taking into account the results already attained, regardless of their origin, however empirical it may be, and, above all, in limiting the field of research to the immediately realizable object in view.

It was certainly to suggestions such as those that I have just outlined that the foundation of the National Physical Laboratory was due, and we cannot help wishing that this magnificent institution may completely fulfil the purpose that seems to be at the basis of all general progress in contemporary industry, and, above all, in metallurgy—namely, to establish and maintain a harmonious balance between the efforts devoted to disinterested general scientific research on the one hand and those spent in the pursuit of immediately utilizable results in the vast and varied provinces of technology.

It is certain that this balance is a function of the particular genius of each nation, and that, even if an organization similar to the National Physical Laboratory was founded in my country, the part played by that institution in our industrial and technical development would be quite different from that which it plays in Great Britain.

Whereas, indeed, our French engineers and scientists are still imbued with the classical bias obtaining of old among us, and always seek to realize their scientific ideal by setting up doctrines of unexceptionable symmetry in accordance with the strictest rules of Cartesian logic, the British engineers and scientists, having outgrown that too rigid and geometrical discipline, more often obey the call of their independent imagination. The results thus attained constitute a vast province extremely varied in aspect, but it is plain that it is more than ever indispensable to sacrifice a little of the picturesque, and to set bounds to that splendid riot of individual enterprise, not with the view of marshalling individual minds in due order according to the German methods of work, and then stripping them of all spontaneity; but only to realize a unity of purpose necessary to their right use and quite consistent with the free play of each mind.

With regard to us French people, we must guard, not so much against the excesses of our scientific imagination, as against our exaggerated love of generalization and of what we call "pure science," to which we are always tempted to give up the seat of honor even at the cost of neglecting a little too much technological researches which are, after all, those alone whose results are of immediate benefit.

I am afraid that I shall appear most exacting to our younger engineers, fresh from college, and fired with enthusiasm for the "scientific sport" that they have practised for many terms, and even more so no doubt to older scientists inured to disinterested research. But I am convinced that I am in the right, and I should be most happy to bring some of you to share my opinion, for a close collaboration of scientists and metallurgists on both sides of the Channel is certainly one of the chief factors in the rapid restoration of the balance of the world so gravely disturbed during the last years by the folly of German Imperialism.

FURTHER AID FOR FRENCH REDUCTION CO.

Legislation was introduced to the British Columbia Legislature of 1918, recently prorogued, giving the Government power to guarantee the bonds of the French Complex Ore Reduction Co., Ltd., to the extent of another \$25,000. The Province already has endorsed this company's issues up to \$40,000. With this capital a plant has been erected at Fairview, B.C., near the city of Nelson, which has been equipped especially for the handling of the peculiarly fractious zinc-lead ores of the Slocan District by means of the French electrolytical process. The cost of plant, however, so exhausted the company's financial resources that it was unable to enter into the custom business on such a scale as to defray overhead expenses and keep ahead and it became necessary to close down. The position was aggravated by the fact that with the phenomenal rise in the quotations on both zinc and lead, following the outbreak of war, the Consolidated Mining and Smelting Co., of Canada, the largest smelting concern of Western Canada, was enabled to install an electrolytical process and to handle the silver, lead and zinc ores of the district. Under these circumstances the French Complex Ore Reduction Co. was compelled to cease operation, but its management is looking forward to the time, which in its opinion seems to have practically arrived now, when the Trail company will be unable to pay the prices it has been giving, and when its cheaper process will be able to demonstrate its value. It is claimed for the French process that it is capable of recovering from 90 per cent. up of the zinc contents of these ores, and that it can be run at a profit when the quotation on zinc falls to 5c. per lb. or thereabouts. The Government, having placed its credit behind the company in the first instance, has indicated, by the legislation referred to and which, no doubt, will be passed, that it is prepared to give the company and its process every chance to "make good."

The Western Fuel Company produced 29,967 tons more in the first three months of 1918 than in the opening quarter of the previous year; the Nanoose Collieries show an increase of 9,172 tons; while the output of the Canadian Collieries and the Pacific Coast Coal Company has fallen off slightly. This, however, is expected to be more than offset by the opening of two new mines, which now are being developed and equipped, one at South Wellington, by the Canadian Collieries (D) Ltd., and the other at Cassidy's Siding, Vancouver Island, by the Granby Consolidated Mining, Smelting and Power Co.

In the Crow's Nest District, the Crow's Nest Pass Coal Co. produced 24,708 tons more in the first quarter of this year than in the first months of 1917, while the Corbin Coal and Coke Co. also has increased its production to the extent of 8,716 tons.

Training of Metallurgists in Schools and in Metallurgical Works*

By H. C. H. Carpenter.

Non-ferrous metallurgy may be divided into two main parts which are quite distinct and well defined. One begins where the other ends. The first may be described as ore-treatment, and its field of operations is the extraction of metals from their ores. It may conveniently be regarded as having fulfilled its function when a marketable metal or alloy has been produced. The second includes the working up of the raw merchantable products of the first by mechanical processes into a variety of finished materials, the founding of alloys, their mechanical and heat treatment, etc. On the whole, while I do not think that there is any generally accepted designation for work of this somewhat composite character, the term metallurgical engineering seems to me to encompass it with sufficient accuracy.

Training in Schools.

The function of the technical school or university to which intending metallurgists come from secondary or higher grade school is (1) to provide the necessary training in the fundamental sciences, physics, mechanics, chemistry, physical chemistry, mathematics, geology and mineralogy, and this should be done before any attempt is made to give any instruction at all in any of the applied sciences. For these two years are necessary. (2) On the above foundations should be raised the structure of the knowledge of the principles of the applied sciences: fuel (including refractory materials), metallurgy, both ferrous and non-ferrous, the strength of materials, power production, and applied electricity. For these two more years will be needed. (3) Every attempt should be made—and made as soon as the students have reached the necessary standard—to get them into the way of acquiring knowledge for themselves, of testing its reliability—and, generally speaking, to instil in them habits of independence of mind, resourcefulness and initiative. I doubt whether the teacher at any educational institution of the kind referred to can render a greater or more absolutely fundamental service to the student who contemplates entering a works, than to awaken and strengthen in him the capacity to acquire knowledge for himself, and to be able to judge when he has acquired it, the precise degree of reliability attaching to it. Whatever the circumstances with which such a man may be faced, and however difficult it may be for him either to act or to give his opinion when called upon to do so in any given situation, if he has this twofold quality—the power to acquire knowledge and the capacity of estimating just how much weight should be attached to it—he will nearly always be about right, and he will certainly never be far wrong. Both these qualities are really indispensable—the one creative, the other destructive in its operations. Each has its function; neither is complete without the other. The necessity for the former is self-evident; but it may be thought that I am unduly stressing the importance of inculcating the habitual use of the critical faculty. May I therefore recall to you the words of one of the noblest and most successful workers in applied science—I refer to Pasteur. Speaking on the occasion of his seventieth birthday to colleagues and pupils at the Institute which bears his name and was founded in his honor, he used these memorable words, which have been

*Extracts from Presidential Address, Institute of Metals, London, March 13, 1918.

more helpful to me in my scientific and technical work than any others that I can call to mind: "Cultivate the spirit of criticism. By itself it is neither a generator of ideas nor a stimulus to great things. Without it nothing will avail. With it will always remain the last word."

To my mind, then, these three elements of training—a sound and broad scientific foundation, an adequate superstructure of knowledge of the principles of metallurgy and cognate branches of the arts and the applied sciences, and the awakening and development of the mental characteristics just touched upon—are what a technical college or university should concentrate upon. Less than this would involve the omission of some essential element of training, more than this it would be unwise to attempt, for it could only be successful with students of unusually high ability, and they can always be relied upon to make good whatever their training. How can these aims best be achieved? I can, of course, only discuss the matter in general terms, and in what follows may I ask you to remember that I am simply endeavoring to contribute something from my own experience that may be worth stating.

Educational influences—using the term in a very broad sense—as a rule operate on the student in the following ways: (1) By contact with his teachers; (2) by contact with his fellow-students, and (3) by the discipline of laboratory work and other ways in which the essential principle is that he has to make the efforts himself. Let me review these briefly.

No. (1) will no doubt at once suggest lectures, and these, though they do not exhaust this category, are at any rate an important feature of it. Are lectures really necessary? To some, no doubt, it may appear that as there are good text-books on the most important aspects of metallurgy, and a vast number of original papers, all that is required is to see that the student studies a proper selection of these. The mere imparting of knowledge, however, such as can be found in text-books, is not, in my opinion, the function of a lecturer. If the student—particularly at the beginning of his specific metallurgical training in the third year, such as I have presupposed—could really master original papers, and especially those dealing with intricate and disputed points of theory, and if he could weigh the evidence as he reads, I should agree that the case for lectures was very much weakened and that their necessity was open to question. But this is just what most students cannot do and what they require training in, and from this point of view lectures constitute a valuable instrument of education. In an hour's lecture it is possible to bring to a focus a wealth of considerations bearing on some given point of theory or practice, and thus to put before the student an aspect of the subject which so far as I know cannot be presented in any other way; and if the lecturer is successful, he will have created in the student's mind—I am, of course, assuming that the student is a willing accomplice, a condition that does not always hold good—a new point of view such as will cause him continually to use his mind on it—in a word, that will make him think, that rare and most precious of happenings. Once this habit is achieved—sometimes it is never achieved—lectures do not require to constitute so large a part of the student's education, and therefore in his fourth year it should be possible to diminish them. In this case they can advantageously be partly replaced by the less formal colloquium in which the students themselves largely take charge of the discussion of problems and important questions. The value of this training in

arousing habits of independence of mind, criticism, and the exercise of judgment is so obvious as to require no elaboration.

(2) That students can and do educate one another is the experience of any teacher who takes the trouble to observe it. This is obvious in a variety of ways, and certainly shows most markedly in successive examination tests. The difference in standard between succeeding years of men is sometimes astonishing, and I have always found that the high standard years are attributable to the influence of one or more students of unusual ability who have raised the level of the remainder. I am not suggesting that this is consciously done on their part—I do not think it is. It occurs simply as the result of the normal intercourse of men who are working together and competing against one another for such a period as four years; and I must say I regard this as one of the most valuable results of the educational system that we have.

(3) Experimental work in the laboratory, if properly chosen and carried out, is a most important—indeed an absolutely essential—element in the training of metallurgical students. It constitutes, in fact, from the point of view of the time taken, much the largest part of the training. I have said it must be properly chosen, because if it is to exercise its maximum educational effect, either it must be related as closely as possible to the principles enunciated in the lectures or the matters discussed in the colloquia, or it should be designed with at any rate some particular end in view. There is, if I may say so, a tendency to make analytical work too prominent a feature of laboratory training. The educational value of a training in accurate quantitative analytical work I should be the first to insist on, but analysis is seldom an end in itself. It is a means to an end, and this is apt to be lost sight of. And the fact that the view is held in many works that the only thing a metallurgist who comes to them from a technical college or university can do is to analyze—and not always that—is a well-justified criticism that we teachers should take to heart and do our best to remedy. What is required, in my opinion, is a course of practical work so chosen as to exemplify and give rigorous training, on the one hand, in the principles of metallurgical processes, and, on the other hand, the testing of metallurgical theories. In such a course analytical methods have their due—but not more than their due—share, and the student gets into the way of viewing analysis in its proper place and proportion. There is to-day an urgent need to see that the training in physical and physico-chemical methods of testing and investigation is the very best that can be devised. Metallography, the testing of materials, and chemical analysis are the handmaids of our industry, and the role of the first named becomes more important every year.

Training in Metallurgical Works.

I have sketched, all too imperfectly and briefly, the broad principles of metallurgical training such as, in my opinion, should be given at educational institutions, and the underlying principles of methods by which such instruction can advantageously be given. I have said nothing as to the training that the student should get in the works itself, and I propose to touch on this aspect of the matter only very briefly, because here my responsibility ends and that of the works begins. The few remarks I am going to make are in the nature of an appeal to the management of the works into which the students enter.

I think the most suitable period at which to link up the training given at the educational institution with that of the works is at the end of the student's third year at the former. By this time he has had instruction in the fundamental sciences and a year at his professional subject, and he should have acquired something of the habits of judgment and independence of mind upon which I have laid such stress. He ought, therefore, to be ready to appreciate what he sees and get some value out of it. He has a three months' vacation, and this time can most advantageously be spent at a works. There is generally little or no difficulty about arranging this, and my own students do it regularly. They then return to their fourth and last year of study at the educational institution with, at any rate, some idea of the kind of work that awaits them at the works, and this should give a reality particularly to the character of the practical work in this year which would otherwise be less vivid. It must be emphasized, however, that the three months' period referred to cannot do more than familiarize in a very general way the student with the nature of works practice. The actual training in this cannot, however, begin until after the end of the fourth year, and this is the point at which I wish to make my appeal. The students who leave us, though they have all had the same training, are men each with his own special character and mental endowment. It is the function of the works they enter to find out what special aptitudes each man has, so that at the end of his period of training in their practice he can be entrusted with work which will make the very best of him. Give him, therefore, for a sufficient time an opportunity of acquainting himself with every side of that practice—not the laboratory methods only, but the practice of each of the operating departments. Give him time to find his feet and to acquire the works atmosphere, and let him have adequate opportunities of obtaining information on any details he wants as to the why and wherefore of any given operation he sees but does not completely understand. Do not stint this period, for it is difficult to over-estimate its importance and possible return to you in years to come. A discerning management will have little difficulty in judging how they can best utilize the services of such a man after this probationary period, during which he should be paid at any rate a living wage.

Some of these men may develop special aptitudes in connection with the requirements of the operating departments. They may—and this is the most vital element of training that no educational institution can ever give, but only the works itself—be found capable of working with and getting the best out of the operating staff and the labor in these departments, which can only be done by the exercise of human sympathy and insight in addition to technical knowledge. In a word, their interest will be the practical operations of the plant rather than the scientific processes which underlie them. Such men are not very common, and they are worth finding out, for they are quite capable of producing reforms in works practice.

Others—in spite of their prolonged training—may never develop sufficient independence of mind or confidence in their powers to enable them to take up a position to which much responsibility attaches, whether in the operating departments or the testing laboratory, but they will usually work well and faithfully under direction and produce results upon which reliance can be placed. Do not despise them. They fill a role which brilliant men would find irksome. They do work which has to be done, and are content to do it.

Others again—and these are usually the men of the greatest originality and imbued with the desire of improving upon existing processes used in the works by discovering new methods—find the most suitable exercise of their faculties in the laboratories where facilities for research work are to be found. These men are to be encouraged, even if results are slow in coming. Some of the leading works of so eminently practical a nation as our brothers in the United States of America have recognized, not only the importance, but the necessity of establishing laboratories where work of this kind can be carried out, and where the theoretical basis of each works operation is investigated more fundamentally than can be done even in a university or technical school, and where no practical results are looked for under a period of from five to ten years. Men who are capable of doing this work are rare indeed, but most of all are they worth discovering and employing in such labors. They are the men who, if I may apply a striking phrase recently uttered by the President of the Royal Society, will produce not merely a reform in your practice, but a revolution.

PERSONAL

Mr. Fraser Reid is now in charge of the Ankerite gold mine as well as of the Coniagas silver mine, operated by Coniagas Mines, Ltd. He will be assisted at the Ankerite by Mr. Douglas A. Mutch.

Mr. D. H. Angus has resigned his position as general manager of Tough-Oakes Gold Mines, Kirkland Lake.

Mr. F. J. Brule, assistant general manager of the British America Nickel Corporation has transferred his office from Sudbury to Deschenes, Quebec, where the company's refinery is to be erected.

Mr. G. L. Fraser has been appointed general manager of the Vancouver Island coal mines of the Granby Company.

Mr. C. H. Taylor has returned to Toronto from Panama.

Mr. M. M. Summerhayes has been appointed manager for the Blueston Copper Mining Co., Nevada.

Mr. A. A. Cole, Mining Engineer for the T. & N. O. Ry. Commission, has returned to Cobalt after a visit to Toronto.

Mr. A. R. Globe, assistant manager at the Hollinger mine, has resigned.

Mr. Charles Morris has been appointed mill superintendent at the Hill Gold mine. Mr. E. H. Williams is manager.

Mr. A. E. Flynn, mining engineer of Haileybury, Ont., is investigating ilmenite deposits in Eastern Quebec.

CHROMITE MINING IN QUEBEC.

Shipments of chromite from the Quebec chromite mines are increasing and the output this year will be considerably larger than that of 1917. The output last year was 35,726 tons valued at \$495,981. The demand for chromite continues excellent, in fact it is impossible to satisfy the requirements.

MORE QUEBEC ASBESTOS MINES IN OPERATION

In addition to steady production at the mines which were in operation last year, several which have been idle for some years are being reopened. The Berlin mine at Rumpelville, the Regent mine at Robertson and the Eastern Townships mine at East Broughton are being reopened and their mining and milling equipment is being replaced.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA

MORE LEAD, ZINC AND COPPER NEEDED FOR SHELLS.

As the Kootenay and Boundary Districts of British Columbia are centres for the production of lead, zinc and copper it is expected that mining activity in these sections will be considerably accelerated as a result of the orders received in Canada from the British Government for a large increase in shrapnel production. It is anticipated that the Trail Smelter of the Canadian Consolidated Mining and Smelting Company will be worked to capacity, and that the operators of the silver-lead-zinc properties of lower British Columbia, will be kept busy in order to do their part in bringing the output up to 220,000 shells a week, which is what the British War Office has requested.

RAMBLER-CARIBOO MINES.

The annual report of the Rambler-Cariboo Mines, Ltd., Slocan, B.C., covering receipts and disbursements from May 1, 1917, to April 30, 1918, has been issued. It shows receipts from shipments of \$78,767, derived from lead ore worth \$63,732 and zinc ore worth \$4,226. Surplus brought forward from last year was \$21,849, making total receipts of \$100,634, including \$17.25 for transfer fees. Disbursements at the mine reached \$62,343 and one dividend of a cent a share, or \$17,500 was paid, making total disbursements, less special discount, of \$42,798, and leaving cash balance of \$20,833 in New Denver, Spokane, and Colfax banks. Ore in transit is worth \$20,000, so that the total liquid resources at time report was issued were approximately \$40,000. For damage done to tramway and buildings by snowslide during the winter \$6,580 was written off as well as \$5,991 for depreciation of buildings and plant. Two of the most pertinent paragraphs of the directors' report read as follows:

"In the past most of our net profits came from the shipment of clean ore, but during the past year we unfortunately encountered but small amounts of clean shipping ore and the operation of the mill on concentrating ore has but little more than paid expenses.

"We will be prospecting during the coming year on what we think is promising ground, and hope to pick up some good, clean bodies. In that event the earning power of the company would improve rapidly."

DEVELOPING MOLLY GIBSON GOLD-SILVER MINE.

Considerable development work is being done on the Molly Gibson gold-silver property in the Nelson, B.C., Mining Division. A tunnel is being driven about 160 feet below the upper workings, to get in below the orebody and allow the rock to be stoped down and taken out by gravity, thus reducing considerably the cost of operation. Those interested believe that it is destined to prove one of the big gold producing mines of British Columbia. It is claimed that a shipment to the Trail smelter yielded \$22.76 per ton in gold and silver. The Provincial Mineralogists' Report for 1917 refers to the Molly Gibson Mine, which is situated 32 miles from the Granby smelter and 56 miles from Trail, as follows: "This mine was closed till the end of June. Work was started in July at the mine, and at the mill in August. All the development work was for enlargement of stopes. Some 367 tons of crude ore

1,759 tons of feed and produced 134 tons concentrates, which was not shipped. A new flotation process was installed and a Hardinge ball-mill is now on its road to the mill. The average number of men employed was fifty."

There will be eight parties of the Geological Survey Branch of the Mines Department, Ottawa, in the field in British Columbia this summer. Several of these are at work already and the others will be equipped as soon as possible. As there are only about 25 such parties at work throughout Canada this year the comparatively large proportion assigned to this Province is taken as an indication that the Federal authorities are recognizing to a greater extent than ever the importance of the most westerly of the Canadian Provinces from a mining standpoint. This view is emphasized by the fact that a permanent Geological Station, under Mr. Charles Camsell, of the Geological Survey Branch, has been established in British Columbia.

Ore Testing Mill for B.C.

Reference has been made in these notes to the intention of the Dominion Government to establish an ore testing mill in British Columbia. It was thought that an appropriation of \$40,000 would be made at the last session of the Federal Parliament, Ottawa, to carry out the project. This action, however, was not taken, so that the mill will not be started this year. Assurances have been received that the financial support necessary will be forthcoming in 1919. It is said that the officials of the Mines Department, Ottawa, realize the need of such a plant in this province; that they appreciate that the operators of the complex ore mines of the Slocan, Boundary and other districts would be materially aided in putting their properties on a paying basis were the means provided by which they could obtain accurate information as to the most economical method of treating their ores; and that it is believed that it is in the general interest of the mining industry throughout Canada that the step referred to be taken with the least possible loss of time.

Increased Wages at Trail.

The Canadian Consolidated Mining and Smelting Co. has granted to the employes at its Trail Smelter a war bonus which gives them an additional 15 cents a day for every working day in the month of May and for six months, starting with June 1st, 1918, an extra 25 cents per day. It is explained that this action has been taken because of a realization that there has been a further increase in the cost of living within the past several months.

Searching for Platinum in B.C.

The quest for platinum in British Columbia is to be vigorously prosecuted this summer. Mention has been made heretofore of the fact that the Dominion Government has put competent engineers in the field for the purpose of investigating reported occurrences of the mineral as well as of the fact that the intention is to examine the placers of the Tulameen District, British Columbia, and some sections of the Cariboo. Since it has been learned that the Department of Mines, Ottawa, proposes to purchase two additional drills and that the intention is to place these drills on placer ground in British Columbia with a view to the establishment of platinum values. If occupied ground is selected a covenant will be obtained from the owners that, in the event of the mineral being located, energetic work in

its recovery will be inaugurated without delay. It is not expected that the Government will demand a monetary return for the development of privately held property believed to contain platinum because of the need of this mineral for munition purposes and the consequent necessity of giving the miners every possible encouragement to produce it.

Building Flotation Plant and Railway for Copper Mountain Property.

The Canada Copper Company continues to carry on its programme of development of its large low grade copper mineral claims situated on Copper Mountain. It now is engaged in the construction of a railway, about fourteen miles long, to the property from the town of Princeton, B.C. There connection will be had with the Kettle Valley Railway. An oil flotation plant, with a daily capacity of 3,000 ton of ore, is being built near Princeton on the line of the new railroad. Cut timber for the structures required for the housing of the mill plant is being supplied by the company's own saw-mill located in the vicinity. The contract for the railroad has been secured by W. P. Tiernay & Son who have 200 men employed and are reported to be making good headway. As soon as the road is advanced far enough machinery will be shipped in for the concentrator and will be installed under the supervision of Mr. Van H. Smith, who has had experience along similar lines in Montana, Utah and other of the Western States. As a result of this activity and the prospect of an early start in the production of copper, its concentration, and the shipment of the concentrates to the company's smelter at Greenwood, B.C., the town of Princeton and the whole surrounding district is experiencing something of a boom, all available houses being rented and a general atmosphere of prosperity being apparent.

A year ago it was announced that the presence of at least 5,000,000 tons of ore in this Copper Mountain property had been proved. Since then there has been considerable increase. Starting with the exploration of the ground by diamond drill work, the company followed with a comprehensive system of tunneling, lateral operations and raises. "This makes possible," General Manager Oscar Lachmund has pointed out, "the ready removal of the ore above tunnel level by glory hole methods and the rest by various stoping methods. The ore lies in parallel bodies adjoining the dikes that traverse the country in northerly and southerly directions. The average content of the ore is 1.75 per cent. copper, although bunches in some sections contain 4 to 5 per cent. The recoverable values in gold and silver are about 20 cents to the ton."

SPINNING ASBESTOS IN QUEBEC.

The Dominion Asbestos Spinning Co. has started at East Broughton, Quebec, a plant for the manufacture of asbestos yarn, carded asbestos and sheet packings. Asbestos cloth, brake linings and packings will be manufactured when the necessary machinery can be obtained.

NICKEL REFINERY IS IN OPERATION.

On July 1 the International Nickel Company of Canada began to treat matte at the new refinery at Port Colborne. A large quantity of matte from the Copper Cliff smelter has been shipped to the refinery and supplies of all kinds are now on hand, and one furnace is in operation.

"The Strathcona Park Amendment Act" is a measure passed by the 1918 Legislature of British Columbia which is of special interest to the prospectors of the North-West. This opens to mining development a highly mineralized section of Vancouver Island, comprising 530,066 acres. It was closed some years ago in order that it might be preserved in its natural state as a National Park. It is claimed by the present Government that the location and the exploitation of its mineral cannot interfere, at any rate to any material extent, with its value as a park, and consequently permission now is given to miners to record claims within its limits and to proceed with the work of their development and the taking out of ore.

USES OF GRAPHITE.

Graphite is in various ways essential to the success of military operations. Large amounts are required for the manufacture of crucibles, for foundry facings, for dry battery fillers, and for a protective polish for explosives. Its most familiar uses, in lead pencils and stove polish, consume comparatively little of the total output.

The crystalline graphite for making crucibles should contain as high as 85 per cent. of graphite carbon and should be free from mica, pyrite and iron oxide, which are particularly harmful impurities. It should also preferably contain a large proportion of flakes 1 millimeter or more in diameter, so that its fragments may interlock and thus be more easily bound together by the clay with which it is to be mixed.

The collieries of the Nicola-Princeton District show a similar improvement, the Middlesboro Collieries increasing their output 14,963 tons, although the Princeton Collieries have dropped about 3,000 tons.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.50 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 12 cents per lb.

July 9, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 11 cents per lb.
Lead, 10¼ cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.

July 9, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.50 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York	London
	cents.	pence.
June—		
25	99½	48¾
26	99½	48¾
27	99½	48¾
28	99½	48¾
July—		
1	99%	holiday
2	99%	48½
3	99%	48½
5	99%	48½

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange, July 10, 1918.

Gold.		
	Ask	Bid
Apex . . . . .	.04	.03
Boston Creek Mines . . . . .	.20	..
Davidson Gold Mines . . . . .	.32¾	..
Dome Extension . . . . .	.10	.08¼
Dome Lake . . . . .	.15	.14
Dome Mines	8.00	7.25
Gold Reef . . . . .	.01½	..
Hollinger Cons.	4.75	4.70
Keora . . . . .	.08	..
Kirkland Lake . . . . .	.30	.27
Lake Shore M. Ltd. . . . .	.65	.63
McIntyre	1.30	1.29
Moneta . . . . .	..	.06
Newray Mines, Ltd. . . . .	.18	.15
Porcupine Crown . . . . .	.13½	.13
Porcupine Imperial . . . . .	.01½	.01
Porcupine Tisdale . . . . .	.01½	.01
Vipond . . . . .	.13¾	.13
Preston East Dome . . . . .	.03	.02
Schumacher . . . . .	.19½	.18
Teck-Hughes . . . . .	.25	.20
Porcupine V. N. T. Gold M. . . . .	.13¾	.13
Thompson Krist . . . . .	.06¾	.06¾
West Dome . . . . .	.08¼	.07¾
Wasapika Gold M. Ltd. . . . .	.40	..

Silver.		
	Ask	Bid
Adanac . . . . .	.08¾	.08
Bailey . . . . .	..	.03
Beaver Consolidated . . . . .	.25	.23½
Chambers-Ferland . . . . .	.13	.11½
Cobalt Provincial . . . . .	.48½	.46½
Coniagas	2.95	2.75
Crown Reserve . . . . .	.22	.19
Foster . . . . .	.03	.027½
Gifford . . . . .	.02¼	.017½
Great Northern . . . . .	.03¼	..
Hargraves . . . . .	.047½	.04½
Hudson Bay	30.00	20.00
Kerr Lake . . . . .	..	5.50
La Rose . . . . .	.38	.35
Lorrain Con. M. Ltd. . . . .	.01½	..
McKinley Dar. Savage . . . . .	.40	.38½
Mining Corp. of Canada	3.05	2.90
Nipissing	8.75	8.65
Ophir . . . . .	.07¼	.06¾
Peterson Lake . . . . .	.09½	.09¾
Right of Way . . . . .	.03½	.02½
Silver Leaf . . . . .	..	.07½
Temiskaming . . . . .	.30¾	.30½
Trethewey . . . . .	.26	.25
Wettlaufer . . . . .	..	.04½

NEW YORK MARKETS.

July 5, 1918.

Connellsville Coke—
Furnace, 6.00.
Foundry, 7.00.

Crushed, over 1-inch: Beehive, 7.30.
Beehive, 7.30.
Straits Tin, spot, f.o.b., none offering.
Copper—
Prime Lake, 26.00.
Electrolytic, 26.00.
Casting, 26.00.
Lead, Trust price, 8.05.
Lead, outside, nominal, 8.05.
Spelter, prompt western, shipment, 8.90 to 9.00.
Antimony—
Chinese and Japanese, 13.00 to 13.25.
Aluminum—Government price, carload lots, f.o.b. plant, effective June 1st:
98-99% Virgin, 33.10.
98-99% remelt, 33.10.
No. 12 Aluminum Co., 33.30.
No. 12 remelt, 33.30.
Scrap aluminum, 33.10.
Powdered aluminum, 65.00 to 70.00.
Metallic Magnesium—99% plus, 1.75 to 2.00.
Nickel—Ingot, 40.00.
Shot, 43.00.
Bismuth, nominal, 3.50.
Cadmium, nominal, 1.40 to 1.50.
Palladium, \$135.
Quicksilver, nominal, 125.00.
Platinum (pure), \$105.00.
Iridium, \$175.
Cobalt (metallic), 2.50 to 3.50.
Tungsten—
Scheelite, best grade, 24.00.
Lower grades, down to 19.00.
Wolframite, best grade, 24.00.
Lower grades, down to 20.00.
Gravel, Fluorspar: f.o.b. mines—Prompt, \$30.00.
Contract, year 1918, 25.00 to 28.00.
Silver (official), 99%.
Metal Products.—The following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:
Sheet Copper—Base prices:
Hot rolled, 33.50 to 34.50.
Cold rolled, 34.50 to 35.50.
Copper bottoms, 42.50 to 44.00.
(Shipments from stock 2c per lb. extra).
Copper Rods—Base prices:
Round, 34.50.
Sq. and rectangular, 35.50.
Copper Wire—Base prices:
Nominal, 28.25.
Brass Products—Base prices:
High Brass—
Sheets and wire, 28.25 to 29.00.
Rods, 25.25 to 27.25.
Low Brass—
Sheets and wire, 31.75 to 33.75.
Rods, 32.50 to 34.50.
Braze tubing—
Brass, 36.37½ to 38.37½.
Bronze, 41.75 to 43.75.
Seamless tubing—Base prices:
Brass, 37.00 to 39.00.
Copper, 40.00 to 42.00.
Bronze, 44.50 to 45.00.
Full Lead sheets, 10.00.
Cut Lead sheets, 10.25.
Sheet zinc, f.o.b. smelter, 15.00.

THE LUCKY JIM SCANDAL.

Northwest Mining Truth, published in Spokane, Washington, has been active in exposing stated irregularities in connection with the Lucky Jim Zinc Mines, Ltd., which had for several years been operating the Lucky Jim mine, situated in the eastern part of Slocan mining division of British Columbia. The Lucky Jim is one of the oldest of the Slocan operating mines, having in the nineties shipped lead-zinc ore to the Pilot Bay smelting works for concentration there. The late Geo. W. Hughes acquired the mine in the early part of the present century and made considerable money out of the zinc ore he mined and shipped to Kaslo for preliminary concentration at the Kootenay Ore Company's sampling mill there. In later years Mr. G. Weaver Loper, of Spokane, obtained control, and he induced many Manitoba men, chiefly residents in Winnipeg, to buy shares in the company he organized. Eventually a first mortgagee took action to obtain possession of the property, but the persistent fight put up by Loper resulted in the Supreme Court of British Columbia appointing Mr. A. G. Larson, of Spokane, well known in West Kootenay district in which he had been superintending mining operations, chiefly at Rossland, for many years. Worked under Mr. Larson's direction, the Lucky Jim paid off two mortgages and a considerable proportion of the unsecured liabilities. Meanwhile Spokane and other shareholders in the company, after having resorted to the courts and taken other means to attain their object, finally succeeded in ousting Mr. Loper from control and possession of the company's books, etc. Searching investigations eventually proved that there had been a serious over-issue of shares.

A letter, dated March 30, 1918, sent by Mr. Walter J. Nicholls, of Spokane, to the Spokane Stock Exchange, as published by Mining Truth, reads thus:

"The audit made of the books of the Lucky Jim Zinc Mines, Ltd., shows an over-issue of 3,094,299 shares and this stock is all transferable, the capital stock having been increased to 6,000,000 shares. I suggest that should you list this issue, that you provide that only shares represented by the new form of certificate registered by A. W. Allen, assistant-secretary, be admitted. Some of the old certificates may be issued for a greater amount than shown on the stubs, consequently you should specify that only the new forms are listed."

In this connection, Mining Truth makes the following editorial comment: "Directors of the Spokane Stock

Exchange have been asked to restore Lucky Jim Zinc Mines, Ltd., to the official list, and, quite properly, the request has been denied. It will be repeated, however, again and again, in the hope that those most vitally interested may be given an opportunity of working off a discredited issue upon the general public. There should be no temporizing and no palliation of the disgraceful episode. In all the mining history of the Northwest no other such astounding scandal has occurred—under the very noses of sworn officers of the law and with a brazen disregard for decency that puts the guilty outside the pale of consideration. Originally capitalized for \$2,500,000, in \$1 shares, that capital has been 'lifted' to \$5,594,000 by a barefaced system of illegal transfers without counterpart anywhere. The fact that genuine stockholders, harassed and bewildered, have failed to protest expansion of capital stock to cover the defalcation does not alter the situation in any way. The whole matter is so disgustingly dishonest that the Spokane Stock Exchange cannot afford to burden itself with the stigma that must attach to even tacit acquiescence in such flagrant violation of law. Any disposition to restore the corporation's stock to good standing could only be characterized as connivance in a most disreputable affair. Compounding of felony is inimical to the best interests of an institution whose prime duty should be protection of the investing public. Until the blame has been placed and the sunlight of truth let in, there is no place for Lucky Jim upon the official list of any organization of self-respecting men."

The editor of Mining Truth has communicated with the Prosecuting Attorney for Spokane and also with the Presiding Judge of the Superior Court of Spokane County. The former, it is stated, declined to act unless some one would first "swear to an information charging anyone connected with Lucky Jim affairs with a crime," but the Judge of the Superior Court will probably bring the matter before a full bench of the Court, with a view to calling a Grand Jury or taking some other steps in the matter.

The editor of Mining Truth also communicated with the British Columbia Registrar of Joint Stock Companies, and has published the following reply from that official:

"The over-issue of this stock certainly is a bad case. My information is that the company, under the present management, is doing all in its power to rectify the situation and prevent the persons who bought the unauthorized shares from suffering loss.



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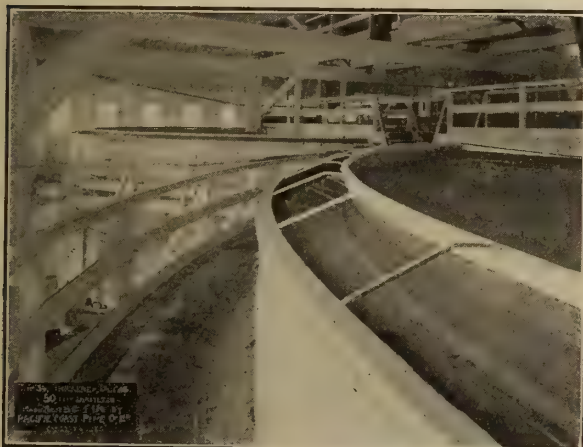
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- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

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THE recent decision in the Butte & Superior Suit with Minerals Separation has an important bearing upon the use of the Pneumatic, or Callow method of flotation.

The Appellate Court's decision at Philadelphia, in the Miami case, had already made clear the distinction between (1) froth produced by violent mechanical agitation of the Minerals Separation process, and (2) simple levitation by air bubbles, as practised in the Callow or pneumatic cell, without such agitation.

Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

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Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Steel Castings— Hadfields Ltd.	Twist Drills—High Speed— Can. B. K. Morton Co.
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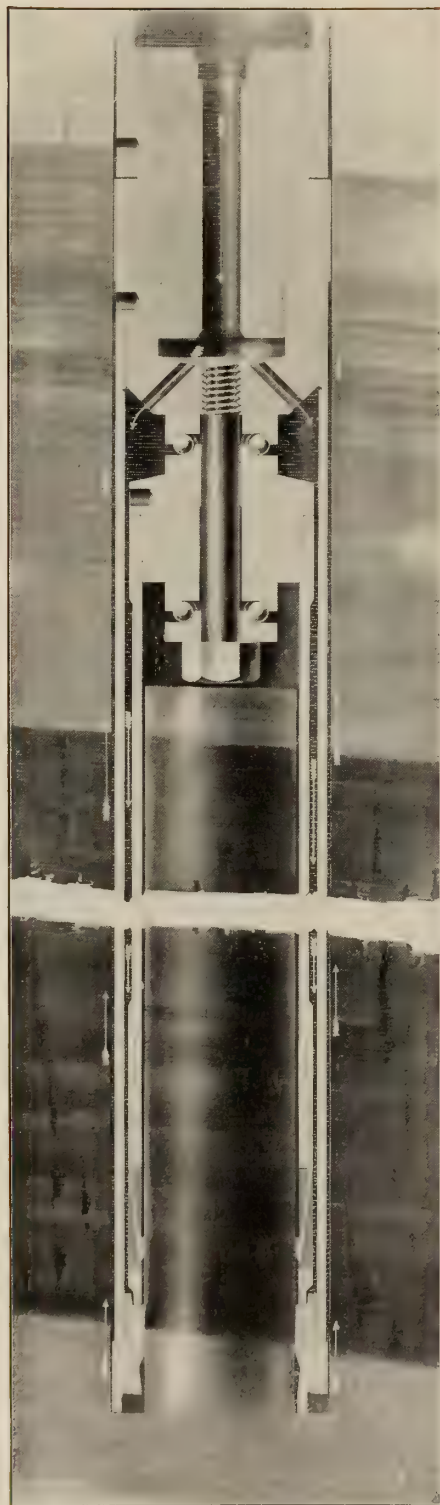
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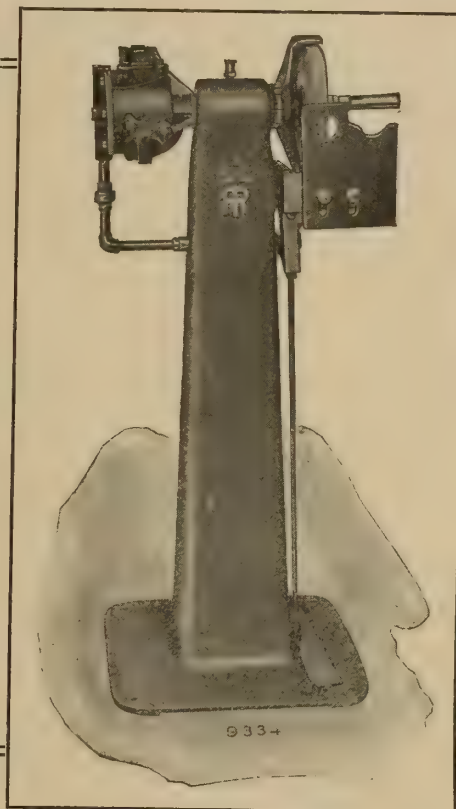


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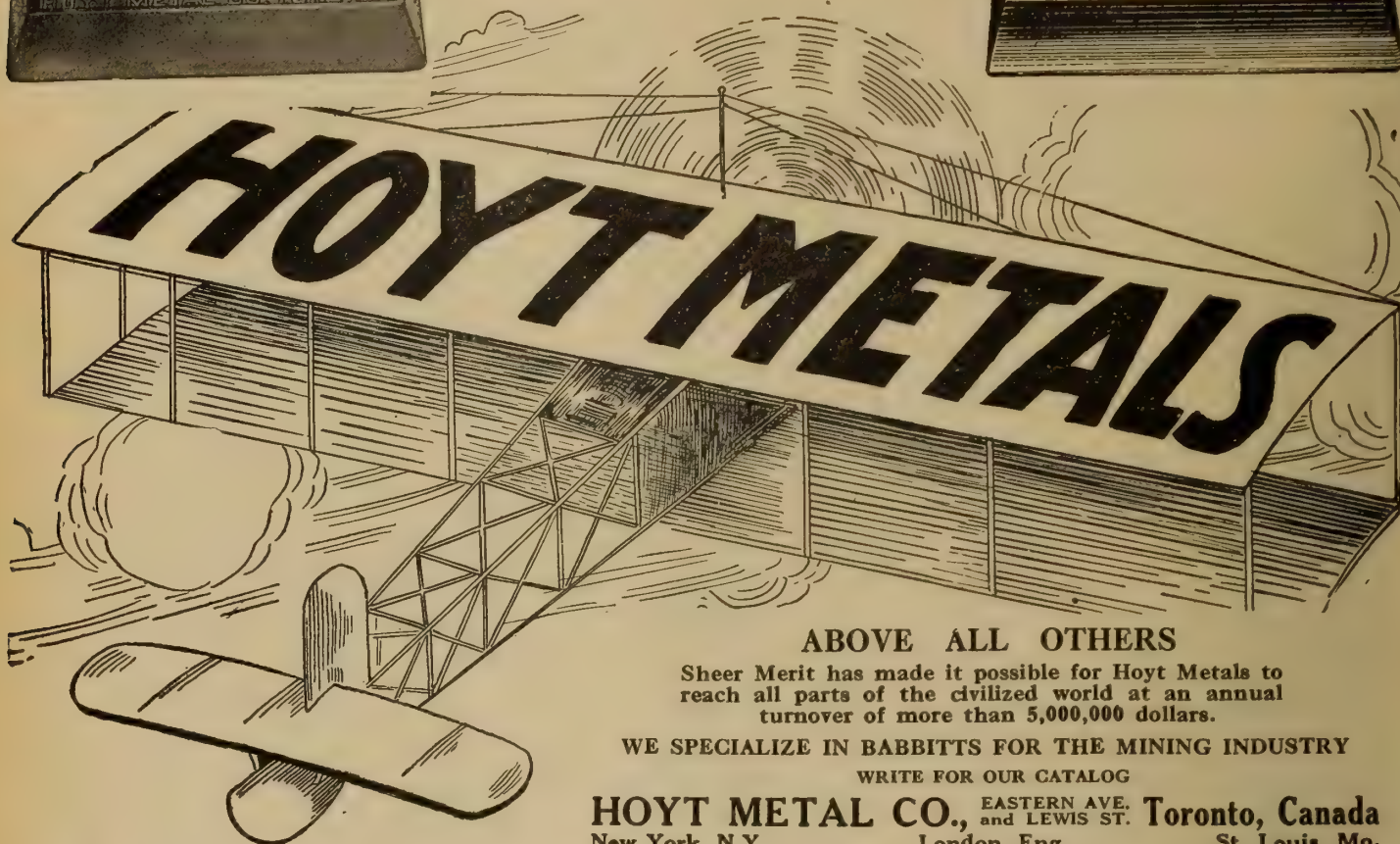
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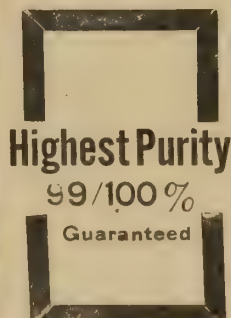
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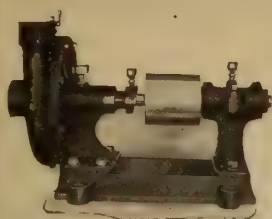


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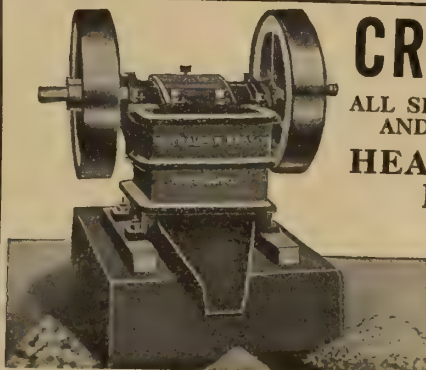
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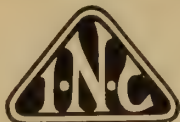
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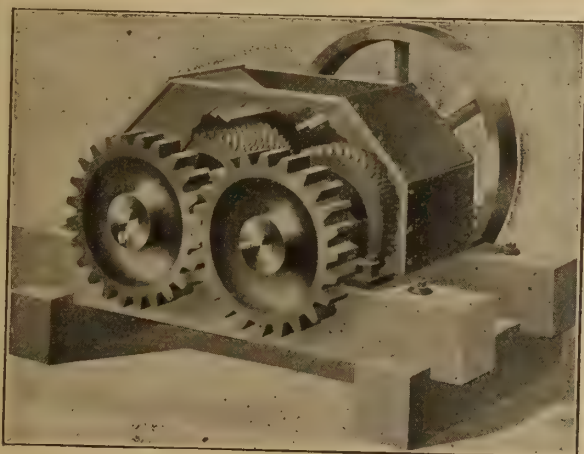
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Department of Colonization, Mines and Fisheries

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The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORE MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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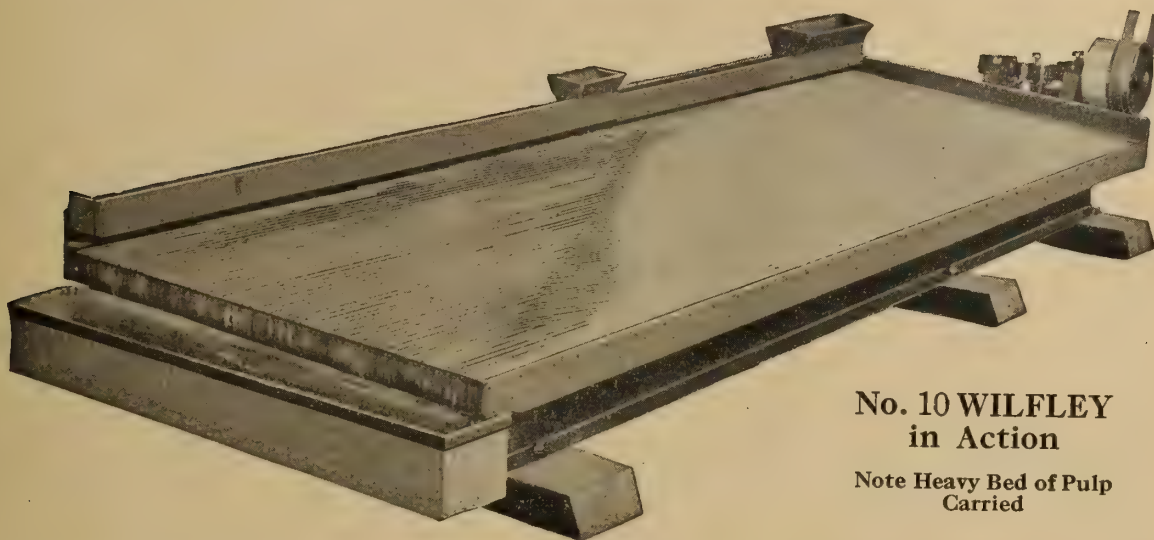
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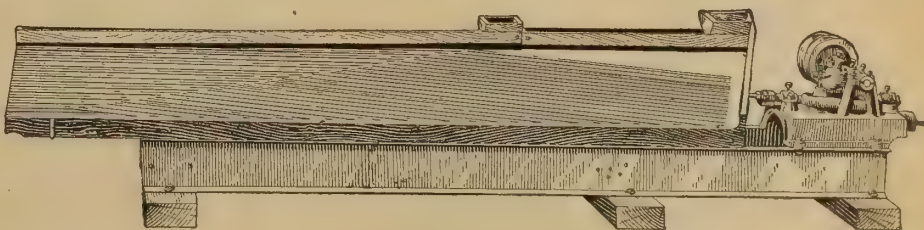
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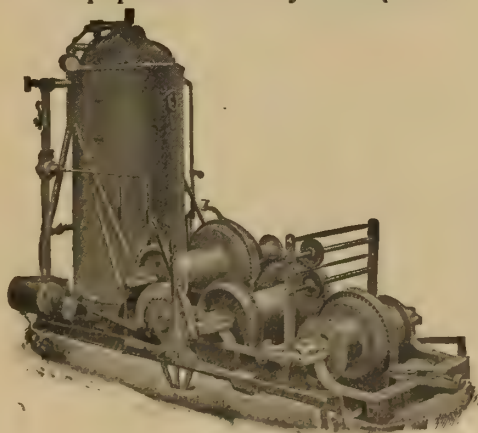
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THE CANADIAN MINING JOURNAL

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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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It may confidently be expected that the larger market for Alberta coal which has resulted from the scarcity of American coal will be held after the war. At present the freight rates prevent Alberta coal from being sold cheaply in Manitoba; but it is reasonable to expect that some adjustment will be made when conditions permit. In the meantime, Canadians will become acquainted with the fact that Alberta coal has not been utilized to the extent that it should.

During the month of May a technical clerk was temporarily required in the Topographical Surveys Branch of the Department of the Interior at a salary at the rate of \$1,300 per annum, and it is stated that "applications will be considered from graduates in Applied Science, honor mathematics, or physics, of some recognized university." Qualified draughtsmen, competent to perform engineering and architectural work are offered \$125 per month. By way of contrast, a "motion-picture camera man" required by the Department of Trade and Commerce is to be given an initial salary of \$2,400 per annum, and a law clerk to an initial salary of \$2,100.

BREAKING THE GERMAN METAL TRUST.

The announcement that the Alien Enemy Property Custodian of the United States has taken over the German metal firms of L. Vogelstein & Co., and Beer, Sondheimer & Co., Inc., may be taken as an indication that the German metal trust is going to fare badly in America in the future. The Germans had, when war broke out, a very strong hold on the metal markets of the world and they displayed considerable ability in keeping control during the war. The impression here has been that the British and Canadian Governments have not handled the metal business in a way to excite much admiration. Our Australian friends showed some time ago that they intended to free themselves of German control of metals and now that the United States authorities have taken action, we may reasonably expect that the governments of all the countries allied against Germany will seriously consider plans for completely breaking the German control of metals. By united action of the allies, the Germans should for all time be prevented from obtaining a controlling interest in the metal business in any country but their own.

Of special interest to Canadians is the announcement concerning Beer, Sondheimer & Co., Inc., successors to the American branch of a German firm which at the opening of the war was agent for the Minerals Separation Company. The behavior of this firm has been such that it would be difficult to consider it other than a dangerous enemy. Naturally the Minerals Separation corporations which were associated with Beer, Sondheimer & Co., have been also under a cloud of suspicion. Up to date, however, there has been no disclosure of evidence which would indicate that the Minerals Separation American Corporation is controlled by Germans and so long as the Alien Enemy Property Custodian of the United States is satisfied we can only assume that the Minerals Separation companies are in safe hands. The question of the status of the American corporation is one that has no doubt received the attention of the American authorities. Some time ago we asked that an explanation be given of the connection between Beer, Sondheimer & Co., and the Minerals Separation companies. The replies have been more or less satisfactory insofar as they showed that the Governments interested were cognizant of the facts and were satisfied. These replies have, however, not removed the suspicion that some Government officers are too easily satisfied and it is a pleasure to note that the American government, which has at its command the services of many leaders of the metal industry, is now exterminating vermin at a rapid rate. There has been a great deal of damage done by these German metal firms in all the countries fighting against Germany. The peculiar behavior of British and Canadian

governments in this matter must have pleased the Germans. We have, however, always had confidence that the leaders in the American metal industry would make short work of the enemy interests when the time came and we now look for more revelations and eventually international action to prevent the Germans from ever again gaining control of the trade in metals.

THE GOLD PROBLEM.

The high cost of production has now made the mining of gold at a profit almost impossible. What is to be done? Is gold needed? Why not close down the gold mines and put the employees at other work? Is it of any advantage to Canada to mine gold when the cost is so high and the selling price remains fixed? Is gold production necessary for the purposes of trade during the war? If gold is needed how can it be obtained? If the government recognizes that gold is necessary, what steps can be taken to encourage production?

The problem of maintaining credit without gold is a Canadian problem and also a world problem. It must be considered from many points of view. Some think that we could get along without more gold for a few years, so long as the attention of everyone is directed solely to the prosecution of war against Germany. Others believe it to be vitally important that production of gold should not be curtailed.

If everyone is willing to assume that there is sufficient gold available there probably will be. Even if some should be unwilling to believe that the gold exists, they will probably not make great demand for their gold during the war. The shipment of gold from place to place to balance credits would be scarcely necessary if such faith existed. It may even be viewed as a confession of lack of faith, unless gold is really essential for the prosecution of the war.

During the war there have been extraordinary movements of gold among the allied countries. The banks are evidently committed to this habit. If it should be found possible to avoid such shipments between allied countries during the balance of the war we may expect a return to old habits as soon as the war is over.

After the war there is to be a readjustment period, the character of which nobody can foretell. If it proves similar to the period following the outbreak of war there will be so much uncertainty in business that confidence in others, in the value of securities of many kinds, and in the future of business enterprises will be disturbed. The value of commodities and labor will fall, but the price of gold will remain stationary. At that time it will obviously be greatly to the advantage of Canada to have large reserves of gold. It is well to remember that in order to build up a supply of gold we must do a lot of work at the mines. Gold deposits do not pay on demand. We cannot leave the mines idle now and expect them to produce large quantities of gold when it is needed most. Moreover, it costs

a lot of money and labor to keep a mine in condition for operation even when not producing an ounce of metal. Gold should be recovered as soon as possible after it is discovered. Gold deposits are of little value to the country so long as they stand unworked. Where labor and capital have brought a mine to the producing stage it is in the general interest that production should continue steadily at capacity until the deposit is worked out.

If it is admitted that a large gold reserve in Canada is worth striving for, it should not be impossible to extend assistance to gold mining companies by paying a bonus on gold produced during the war. That gold is necessary during the war has been pointed out by competent authorities; but the necessity seems to be that the allies, and not Canada particularly, need it. The encouragement of gold production during the war for war purposes should therefore come from international action, Canada falling in line with the larger producing countries. Our governments have to consider also what should be done to utilize Canadian resources to maintain Canada's credit after the war. This is also a matter which cannot be postponed until after the war, for if gold is wanted then much of it must be mined now.

While a bonus system would be necessary in order to permit the profitable working of some of our gold mines, it is probable that a fairly large production could be profitably made without a bonus if the labor supply were improved. At present the efficiency of the workers is very low and to this cause the managers of the chief producers attribute largely their inability to operate satisfactorily. Given the choice of a bonus or a force of efficient miners, few managers would hesitate to take the latter.

UTILIZING WESTERN COAL.

One result of the shortage of coal in many parts of Canada has been the direction of attention to the coal resources of the Western Provinces. Good bituminous coal in very large quantities occurs in Alberta and British Columbia; but it has nevertheless been customary to import both bituminous and anthracite coal to supply the West. It has been difficult to make consumers realize in the heat of summer that there will be a shortage of American coal next winter. Last summer the output in Alberta was necessarily small. About two months ago the Provincial Government started an advertising campaign, advising people to stock their coal early. Good results are now being obtained from this campaign and sufficient orders have been received to warrant running the mines at capacity. To-day Alberta coal mines are shipping to Manitoba 2,000 tons per day as compared with 200 tons per day a year ago. In the Drumheller district the production in June was 93,000 tons as compared with 31,397 tons in June last year.

Nodulizing Flotation Concentrates

In the latter part of 1917 there were carried out near Princeton, in Similkameen district of British Columbia, by Mr. R. M. Draper, of Southboro, Massachusetts, U.S.A., formerly with the U.S. Metals Refining Co. at Chrome, New Jersey, some experiments for the Canada Copper Corporation in nodulizing copper concentrate from a preliminary small concentration plant the company had for some time been using in testing methods for the concentration of copper ore from its mines on Copper Mountain, at which much exploratory and development work had been in progress for several years.

This company now owns and operates mining properties in Boundary and Similkameen districts, and copper smelting works at Greenwood in the former district, previously owned and worked by the British Columbia Copper Co. Much of the commercial ore in the company's largest mine, the Mother Lode in the neighborhood of Greenwood, having been exhausted, mining operations have for some time past been largely concentrated at the Copper Mountain mines, at which about 12,000,000 tons of copper ore is estimated to have been practically proved to occur, with a reasonable prospect of considerably more being developed, when much more work shall have been done on the large group of mineral claims in the locality owned by the company.

In passing, it may be mentioned that the company's smelting plant at Greenwood is modern in design and equipment and is likely to be used in smelting ore and concentrate from its Copper Mountain mines. In a published paper, descriptive of this plant, Mr. Frederic K. Brunton, formerly superintendent of the works, stated that it "is of special interest to metallurgists for several reasons. It was successfully smelting in blast-furnaces the lowest-grade copper ore of all plants in America. In order to do so, it had to run at very high efficiency, which necessarily required a large tonnage per square foot of hearth area, together with the minimum amount of labor and other costs. The furnaces smelted daily 2,250 tons of ore (6.62 tons per sq. ft. of hearth area), carrying 0.85 per cent. of copper, at a smelting cost of \$1.18 a ton. The entire plant required 130 men to operate it and keep up repairs, showing a labor efficiency of about 17.5 tons per man per day." Of the three blast-furnaces, two are 51 by 360 in. and one 51 by 240 in. at the tuyeres, making the total smelting capacity 2,400 tons a day.

The process of nodulizing concentrates is carried out by passing the material through a revolving kiln, the while subjecting it to sufficient heat to cause the fine particles to roll up and adhere together in a ball; at the same time care must be taken not to make the temperature in the kiln hot enough to melt the concentrates.

While nodulizing is no longer an experiment with oil as fuel, the process having been introduced at Chrome five or six years ago, and since used on a commercial scale, it is believed to be quite an experiment on flotation concentrate, using coal-dust as fuel, certainly so far as known in the North-west.

The position was that, while the Canada Copper Corporation had satisfied itself as to the adaptability of the flotation process for the concentration of ores from its Copper Mountain mines, which ores have been estimated to have an average assay value of 1.74 per

cent. copper, the problem of how best to make the fine flotation concentrate suitable for charging into the blast-furnace had not been solved. Hence the experimental work on nodulizing conducted near Princeton last year by Mr. Draper for the company.

It happens that there is at East Princeton, distant about twelve miles from the Copper Mountain mines, a cement-manufacturing plant that had for some time been inoperative, so, notwithstanding that the cement rotary kiln available there is of present standard size and larger than had been found suitable for nodulizing at Chrome, it was used by Mr. Draper in carrying out his experiments there. The dimensions of this kiln are: length 125 ft., and inside measurement 7 ft. It is about 25 ft. longer than need be for the nodulizing work for which it has been used. Despite this disadvantage, however, very successful results were achieved by Mr. Draper; the nodulized product being material of a character suitable for reduction in the blast-furnace, with about 82 per cent. of its sulphur content retained, which is an important consideration in a country where the percentage of sulphur in the ores available for smelting is generally already too low.

It was estimated that a 100-ft. rotary kiln would nodulize from 100 to 125 tons of flotation concentrate in 24 hours. At East Princeton both mine run and slack coal is obtainable from a nearby coal-mine, while included in the equipment of the local cement works is all the plant requisite for drying and pulverizing the coal, which, after having been pulverized, is fed into a hopper, from which it runs into a blast-pipe and is blown thence into the kiln. Electricity is generated at the cement works for other uses, so that the comparatively small amount of power required for operating the kiln is obtainable at small cost, while the charge for labor in attending to the kiln and, as well, for repairs to it, is quite small.

It may be added that, while quite successful results were obtained in nodulizing flotation concentrate from both the Copper Mountain plant and another mill at Highland Valley, in Ashcroft mining division of British Columbia, experiments made with table concentrate, also at East Princeton, were not so successful.

Results of Previous Work.

For the information of those not already familiar with the results previously achieved in nodulizing both blast-furnace flue dust and fine sulphide concentrates, the following excerpts have been made from a paper by Mr. Lawrence Addicks, of Douglas, Arizona, presented at the Salt Lake, Utah, meeting of the American Institute of Mining Engineers in August, 1914 (see Trans. A.I.M.E., Vol. XLIX., 1914, pp. 500-6), in which an account is given of what had then been done to solve a problem arising from the "constantly increasing piles of unsmelted blast-furnace flue dust," that at the smeltery connected with the Chrome, New Jersey, refinery of the U.S. Metals Refining Co., had proved embarrassing; and from the discussion of that paper.

Mr. Addicks wrote, in part: "The charge was fine and 10 to 15 per cent. of it was blown into the flue. Sulphur was at that time too scarce to make the sintering of the finer part of the charge attractive, and raw-ore smelting in a reverberatory with a partly oxidized charge was not to be thought of.

"A great many schemes were considered, including leaching, blowing into the converters, and briquetting,

the problem finally narrowing down to blast roasting and nodulizing. It was found by experiment that blast roasting would not yield a satisfactory sinter without the addition of coke dust or sulphide fines to augment the fuel value of the flue dust, and on this account, together with the low cost of a kiln, the latter was decided upon.

"Two tons of flue dust was tried out in the experimental kiln in the laboratory at Yorktown, Va., of J. H. Payne, who acted as consulting engineer in this connection. This kiln was approximately 2 ft. in diameter and 20 ft. long and was fired with fuel oil. A run of several hours yielded excellent nodules. The kiln showed no tendency to build in and form 'nose rings,' and gave a fuel consumption of 50 gal. of oil per ton of flue dust. There was no indication of any stack loss. The roasting was strongly oxidizing. A study of what full-size kilns were doing on cement clinker and on nodulizing pyrites cinder indicated that a 60 by 6 ft. kiln would certainly not consume more than one-half of the oil per ton of flue dust shown on the test and as fuel oil at that time was selling around 2½ cents a gallon, it was decided to let it go at that.

"A 60 by 6 ft. kiln was decided on, as that is standard in cement practice, although fast being replaced by much larger ones with their greater fuel economy, and as it fitted in the building space available. A 6-in. brick lining brought the net diameter down to 5 ft. The inclination toward the discharge end was fixed at ⅝ in. to the foot, and the revolutions per minute at 1½.

"The results, while satisfactory, were quite different from those anticipated. In the first place, the fuel consumption was far lower than had been expected. A granular sand can be made with perhaps 8 gal. per ton, a first-class smelting product with 12, and great chunks with 16. It appears, therefore, that such a test kiln as that used takes about four times the fuel that will be required on a 60-ft. installation, although this ratio might be changed for different material with varying internal fuel values.

"In the matter of formation of nose rings, the test kiln was deceptive. There was a decided tendency to such formations and it took some time for the operators to acquire the necessary skill to control this. Steady conditions of flame are very necessary. If the kiln is overheated, semi-molten material forms on the walls and a subsequent over-chilling will plaster the sand on very rapidly. A number of devices were tried to meet this difficulty, but finally it was found that reasonable skill and care on the part of the attendant and an occasional shut-down of a few hours to remove any obstinate obstruction were the best remedies. . . . When perfectly clean 75 tons of flue dust can readily be nodulized in 24 hours, while a choked-up barrel will deliver less than one-half of this quantity. There is no difficulty in regular work in delivering 50 tons a day, including all delays, and a few hours' work for two or three men once in two weeks will handle the accretions."

Nodulizing Concentrates at Braden.

In discussing Mr. Addick's paper, Mr. James H. Payne, Baltimore, Indiana, first outlined further experimental work he had done on flue dust and then continued:

"In the early part of 1914, I succeeded in interesting the Braden Copper Co. in nodulizing, with the result that an extensive series of tests were made in Yorkton upon oil-floated concentrates covering quite a wide

range in analysis. These tests led to trials in the Chrome rotary, on the part of the U.S. Metals Refining Co., of Minerals Separation concentrates which they had in stock, and later to test runs to check up the Yorkton runs on Braden concentrates. The large-scale tests checked up with the Yorkton tests in every way (except fuel consumption, which was, however, correctly predicted), and led to the Braden Co.'s decision to adopt the process at Braden.

"The fuel consumption upon oil-floated concentrates is not more than 6 gal. per ton, and in many cases is less. The action in the furnace is independent of the sulphur content, and there is actually less tendency to form nose rings in the Chrome rotary than upon flue dust. It is believed that the improvements entering into the design of the Braden kilns will cut down the nose-ring trouble to where it will no longer be a drawback to the process.

"The flue dust produced by the kiln itself is practically nil, although some of the material treated has been as fine as 82 per cent. through 100 mesh. This is unbelievable to metallurgists familiar with the old Bruckner roaster, but the conditions are entirely different. The material is fed wet and what dust there is precipitates in the atmosphere of steam at the exit end. The material, furthermore, is constantly moving downward to the hot end and is in a dry, dusty state but a short time, soon changing to a densified condition which is no longer dust.

"The amount of sulphur in the nodules is under perfect control. It can be as high as 15 per cent. or as low as 5 per cent., as may be desired. The upper limit for good working appears to be about 15 per cent., as the nodules are very sticky, with higher sulphur content. A product running 13 to 15 per cent. sulphur has been readily obtained on all oil-floated concentrates so far tried, where the object was to retain all sulphur possible. This makes pyritic blast-furnace smelting of sulphide concentrates possible.

"The size and character of the product has varied with the different concentrates tested so far, and also with the sulphur content sought for. When high sulphur is desired in the product, the nodules run smaller than the flue-dust nodules, as produced at Chrome. They are, however, entirely free from material that would blow out of a blast furnace. A number of samples tested show from 42 to 45 per cent. of voids.

"Nodulizing of sulphide concentrates, particularly oil-floated concentrates, opens up a new field because it makes possible pyritic smelting of such material. Further, the operation appears to be such a cheap one that it may compete with roasting in multiple-hearth furnaces in reverberatory practice. If so, it would be far preferable to roasting in the case of the exceedingly fine-oil-floated concentrates, because of the large amount of dust that the roasters must necessarily produce on this material."

Success at Chrome on El Cobre Concentrates.

Mr. R. M. Draper also took part in the discussion, as follows:—

"The kiln will treat El Cobre flotation concentrates very successfully. There does not seem to be much of a tendency to form ring accretions, and those that do form are nearer the discharge end of the kiln, where they may be removed much more readily. The temperature of the kiln is much lower for concentrates than for flue-dust, and the oil consumption much less. Our consumption of oil was about 6 to 7 gal. per ton of concentrate.

"The nodules were very satisfactory from a blast-furnace point of view when charged into the furnace cold. We did have considerable trouble with crusts on the furnace, if we put in too much of the hot nodules, due probably to the fact that they were near the smelting point when charged into the furnace and naturally smelted much higher up in the furnace. I think we would have had this difficulty with any hot material that was charged. In fact, we found the same tendency to crust when we tried the experiment of charging hot converter slag into the furnace several years ago.

"The concentrate feed averaged about 30 per cent. sulphur, and several samples of nodules taken at various times showed an average of 14 per cent. sulphur. One sample of nodules chilled immediately in water showed a sulphur assay of 20 per cent. There is no difficulty in averaging 60 tons of the concentrates per day, and I believe that, with a proper feeding device, the tonnage could be increased to 75 tons a day. There is no question that the greater the tonnage the less the consumption of oil per ton.

"Screen Test on Nodules from El Cobre Concentrates.

	Per cent.
"Between $\frac{1}{2}$ and $\frac{1}{4}$ mesh	25.95
" $\frac{1}{4}$ " 8 "	44.75
" 8 " 16 "	24.52
" 16 " 20 "	1.64
" 20 " 30 "	1.93
" 30 " 40 "	0.46
" 40 " 60 "	0.33
" 60 " 80 "	0.14
" 80 " 100 "	0.04
" 100 " 120 "	0.06
Through 120 mesh	0.18

100.00

It will be noted that, although all the product is under $\frac{1}{2}$ in., the proportion of real fines is very small.

British Columbia's Coal Production in Half Year

The Vancouver Island Collieries produced 137,895 tons of 2,240 lbs. for the month of June, a little over 5,000 tons less than the quantity produced in the month of May.

The tonnage produced by the various companies was as follows:—

	Tons.
Canadian Western Fuel Co., Nanaimo Colliery	61,685
Canadian Collieries (D), Ltd., Comox Colliery	47,926
Canadian Collieries (D), Ltd., Extension Colliery	18,367
Pacific Coast Coal Mines, Ltd., South Wellington	8,417
Nanoose Collieries, Ltd., Nanoose Colliery	1,500

137,895

For the first six months of the year the Vancouver Island Collieries produced 857,131 tons, a decrease of 24,881 tons, as compared with the same period last year. The producing mines are three less than was the case in 1917, namely, the Jingle Pot Mine, South Wellington Mine, Pacific Coast Coal Mines, Ltd., and No. 4 Mine, Canadian Collieries (D), Ltd., Extension Colliery. The Jingle Pot Mine alone produced 48,885 tons during the first six months of last year, so that, in spite of the loss in tonnage from this mine and the others since closed down, the tonnage has been well maintained.

The tonnage produced by the various companies for the first six months follows:—

	Tons.
Canadian Western Fuel Co., Nanaimo Colliery	389,984
Canadian Collieries (D), Ltd., Comox Colliery	280,151
Canadian Collieries (D), Ltd., Extension Colliery	118,148
Pacific Coal Mines, Ltd., South Wellington ...	51,181
Nanoose Collieries, Ltd., Nanoose Colliery	17,667

857,131

The Canadian Western Fuel Co. at its Nanaimo Colliery has made a gain of 63,515 tons for the first six months of the year.

The Canadian Collieries (D), Ltd., at its Comox Colliery, has made a gain of 21,233 tons thus far, but has lost 32,014 tons at its Extension Colliery. This is accounted for by the closing down of No. 4 Mine, as previously mentioned.

The Pacific Coast Coal Mines has a loss in output of 36,816 tons for the first half of the year. This is explained by the abandonment of the South Wellington Mine.

The Nanoose Collieries has made a gain of 9,086 tons, while the Jinglepot Mine of the Vancouver Nanaimo Coal Company, as stated, has produced no coal this year, while for the first half of 1917 its output was 48,885 tons.

The No. 5 Mine of the Canadian Collieries is now producing about 100 tons daily from development work and should considerably augment the Island tonnage before the end of the year.

The new mine at Cassidy's Siding, E. & N. Ry., which is being opened by the Granby Consolidated Mining & Smelting Co., is now producing coal from the development work. Some 1,000 tons has been dumped at the surface of the mine, but no shipments have been made as yet. The Island tonnage should be somewhat augmented by the production of this colliery before the end of the year.

A pair of shafts are now being sunk for the purpose of opening up a new mine on the Company's Farm near Nanaimo by the Canadian Western Fuel Co., and coal will probably be reached by October of this year; and shipments made before the end of the year.

The coal produced by the mines of the Nicola-Princeton district for the first six months of the present year was 19,972 tons in excess of that produced in the same time in 1917.

The tonnage to the credit of the several companies for the first six months of 1918 follows:—

	Tons.
Middlesboro Collieries	54,698
The Fleming Coal Co.	12,637
Princeton Collieries, Ltd.	22,148

89,483

The Middlesboro Collieries has made a gain of 19,152 tons over last year, and the Fleming Coal Co. (formerly the Inland Coal & Coke Co.) has exceeded last year's showing for the same period by 5,198 tons. The Princeton Collieries has made a gain of 355 tons.

The Merritt Collieries has not been operating this year, while last year, for the first six months, its output was 4,782. Despite this handicap, the district shows an increase of 19,152 tons.

While the returns of the Crow's Nest Pass Field are not available, it is known that the entire output of British Columbia, for the first six months of 1918, is considerably in excess of the showing made in 1917.

Mining Convention at Revelstoke, B. C.

The annual Northwest International Mining Convention of 1918, which was attended by delegates representative of the mining men of Washington, Idaho, and Montana as well as the Provinces of Alberta and British Columbia, was held at Revelstoke, B.C., on the 8th, 9th, 10th and 11th of July. It was one of the most outstanding assemblages of its kind in point of attendance, the high standard of addresses and of the general discussion, the enthusiasm with which the idea of co-operation, regardless of the National boundary, was endorsed, the very evident desire of all to assist in paving the way to further progress in the development of the mining resources of the North country, and, last but not the least notable, the splendid entertainment furnished the visitors by the citizens of Revelstoke.

One of the features of the opening session was the occupancy of the chair by Mrs. Ralph Smith, the first woman member of the Legislature of British Columbia, and the first of her sex to preside over the deliberations of such an organization. In thanking the delegates Mrs. Smith said that she appreciated the honor because it was a recognition of the right of womankind to a more prominent and influential part in shaping the policies of governing and semi-governing bodies of the country. She trusted that the Convention would follow up such resolutions as might be passed by action to the end that the mineral resources of the two nations represented might be more fully developed.

Mr. Alex McRae was chairman of the Executive Committee in charge; Mr. W. J. Coulthard, vice-chairman; Mr. F. B. Hill, secretary; Mr. L. A. Howson, assistant secretary; Mr. K. G. McRae, treasurer; and Messrs. W. A. Anstie, H. McKinnon, B. R. Atkins, A. Johnson, W. R. Grubbe, and M. H. Lister, and Dr. W. H. Sutherland, the latter being the member of the legislature for Revelstoke. Through their efforts the Convention programme was prepared and a mineral exhibit was assembled comprising samples from practically every known British Columbia mining camp. The Canadian Consolidated Mining & Smelting Co. contributed a special display of the products of its smeltery. Mr. T. O. Bibb was in charge of the exhibition.

Mr. A. G. Langley on Prospects.

Mr. A. G. Langley, Provincial Resident Mining Engineer for the Revelstoke District, gave the first address, the subject being "Discovery and Development of Prospects." He said that the District had been prospected for gold, silver, lead and other minerals to some extent, but there was much to be accomplished. He sketched mining activity from the "eighties" in the Big Bend, Trout Lake, Ainsworth and other mining camps. Emphasis was laid on the importance, when a good find was located, of thoroughly prospecting the adjacent sections and valuable hints were given with reference to the finding of ores peculiar to the Kootenays of British Columbia. Dealing with development the speaker stated that the prospector and miner should not crosscut his course until he finds himself justified by his original findings. Too much work should not be done until it is definitely established that the ore is likely to be sufficiently valuable to warrant the expenditure of labor and money. Mr. Langley thought special attention should be paid to the development of

minerals especially required for war purposes and deprecated "wild-catting," asserting that mining, if carried out along proper lines, was a good investment.

Mr. Bruce White on Resources of Revelstoke District.

Mr. Bruce White, of Sandon, B.C., chairman of the Western Section of the Canadian Mining Institute, discussed "Geology and Mineral Resources of the Revelstoke District." Declaring that there were greater varieties of geological formations in this section than in any other part of British Columbia he said that even the rare metal, tin, was found in pegmatite rock on the headquarters of McDougall Creek. This pegmatite was an altered granite and quartz mixture and was of the pre-Cambrian age. Tungsten was likely to be found in this vicinity or might be associated with the tin in the form of scheelite. In the Trout Lake district manganese was in evidence while molybdenum, another war metal was found in several places along the Arrow Lakes in the altered granite formation but very little work had been done on them. The Big Bend Country, north of Revelstoke, had been well-known for over fifty years, its placer mining having first brought it into prominence. The speaker referred briefly to the Trout Lake and Lardeau District and its mineral riches and concluded by expressing the opinion that the Revelstoke District's possibilities were not realized and that all that was necessary to bring about notable development were men and capital.

Hon. John Hart on Taxation of Mines.

Hon. John Hart, Minister of Finance, took for his text "Taxation, as it affects the Mining Industry." He said, in part:

"For the benefit of those of you who have not had experience with British Columbia taxation of mines, I might state that until 1896 the output of mines was made a subject of personal property tax. In 1896 an amendment to the Taxation Act was passed placing mines and mineral in a separate class of property. The amendment stated that there shall be assessed, levied and collected from every person owning, working or leasing a mine, a tax of one per cent. on the assessed value of ore raised from the land, the value of the ore to be determined by smelter returns.

"In 1900 a further amendment was passed to the Act making the rate two per cent. on the ore produced, providing, however, that all ore producing mines not yielding a market value of \$5,000, and on placer or dredging not producing a gross value of \$2,000 in any one year shall be entitled to a refund of half the tax paid in the case of ore mines and of the whole tax in case of placer and dredging mines. The tax imposed by this amendment was in substitution for all taxes upon the land and upon personal property used in the working of said mines.

"In 1901 there was a further amendment stating that the owner of a mine shall be exempted from payment of income tax from income on mines. In 1902 a further amendment was put through to the effect that the gross output of placer or dredging mines to the value of \$2,000 should be exempt from taxation.

"In 1903 an amendment was carried, repealing the portion of the Act exempting mines from income tax; but substituting a clause that, in addition to exempting ore mines from income tax, coal mines also should be exempt from the income levy.

"In 1911 a Commission was appointed to revise the statutes and when its work was completed it was found that instead of having repealed the amendment of 1903 regarding the exemption of mines from income tax, part of it was left out, with the result that only coal mines were exempt from income tax. As there was no provision in the consolidated act to treat the two per cent. tax as being in substitution of all other taxes, the assessors in 1912 assessed the Granby Consolidated Mining & Smelting Co. and the Canadian Consolidated Mining & Smelting Co. on income. In 1913 the omission was corrected by an amendment and ore mines were again exempted from income tax. From the 1913 amendment to the 1917 amendment, mines were only taxed two per cent. on the output. This two per cent. tax for the year 1917 from all mines amounted to approximately \$285,000.

"When the present Government took office in 1916; the late Ralph Smith became Minister of Finance. He immediately commenced an investigation of taxation, particularly as to its effect on mining; but his untimely death lost to us the benefit of his experience and his researches. The late Mr. Brewster, who was then Premier, was obliged to take charge of the Finance Department temporarily and although he suggested amendments to the Act he had not sufficient time to supervise the details of the amendments and their effect on the mining industry with the result that the changes made were not considered equitable.

"In 1916 the rates of taxation were as follows:

- A. One per cent. taxable income up to \$2,000.
- B. Over \$2,000 and not over \$3,000, taxable income $1\frac{1}{4}$ per cent.
- C. Over \$3,000 and not over \$4,000, $1\frac{1}{2}$ per cent.
- D. Over \$4,000 and not over \$7,000, 2 per cent.
- E. Over \$7,000, taxable income $2\frac{1}{2}$ per cent.

"By Section II. of the Amendment Act, 1917, the clause exempting mines from income tax, inserted in 1913 was struck out, thereby bringing mining companies under the above scale of income tax, but in addition to this there was a sur-tax passed which imposed a further tax of one-half of one per cent. on incomes above \$3,000 and not exceeding \$4,000; two per cent. on incomes over \$4,000 but not exceeding \$7,000, and $2\frac{1}{2}$ per cent. on incomes above \$7,000; and further, there was a special Sur-tax of $7\frac{1}{2}$ per cent. on the excess of incomes over \$50,000. Therefore for 1917 the total income tax was 5 per cent. up to \$50,000 of taxable income and $12\frac{1}{2}$ on excess income above \$50,000.

"By a further amendment to the Taxation Act of 1917 the income tax for 1918 and until further amended is as follows:

- On taxable incomes not exceeding \$2,000, 1 per cent.
- Over \$2,000, not exceeding \$3,000, $1\frac{1}{4}$ per cent.
- Over \$3,000, not exceeding \$4,000, 2 per cent.
- Over \$4,000, not exceeding \$7,000, 4 per cent.
- Over \$7,000, not exceeding \$10,000, 5 per cent.
- Over \$10,000, not exceeding \$20,000, $7\frac{1}{2}$ per cent.
- Over \$20,000, 10 per cent.

"I took office of Minister of Finance in June, 1917. One of my first duties was to assess mining companies under the terms of the 1917 amendment and Sur-tax Act. On a close study of conditions I found that mining companies were taxed, not on profits, but nearly on gross income. In ascertaining the taxable income no deductions could be made for depreciation of plant, for development work or managers' or directors' salaries resident in the Province, while shareholders receiving dividends from mines were obliged to pay

further tax on such dividends and in addition to this the two per cent. ore tax had to be collected.

"After having explained in detail the drastic effect the enforcement of the Act would have on the mining industry, I was authorized not to assess under the Act as it then was, but to investigate and prepare amendments that would refine the Act to a more reasonable and equitable measure and make these retroactive to 1917.

"During the year 1917 and prior to the 1918 Session, I had many opportunities of discussing taxation of mines with representatives of mining interests and I can say that the point of view of the mining men was very forcibly placed before the Government. The Government realized from the outset of the conference with the mining men that they were not trying to evade a just and fair tax, but that they were anxious to assist us in the solution of the difficult problems with which we were confronted. On the other hand I think I am right in saying that the mining men soon realized that they had the sympathy of the Government and while we were anxious to increase our revenue we were determined not to do so at the risk of crippling the great industry of mining on which this Province depends so much for its progress and prosperity.

"During the Session of the British Columbia Legislature of 1918 I am pleased to say the whole of the suggestions of the mining men, with one exception, were crystallized into legislation. The following allowances or deductions were made:

In addition to administrative expenses and necessary expenditure made for mining, an allowance for depreciation of plant not exceeding 15 per cent. per annum of value.

Development work in connection with ore from which an income is derived.

Salaries of managers and directors who reside in the Province and who are liable for income tax themselves.

Dividends from mines are not again taxed, and in addition it was arranged not to collect income tax and the 2 per cent. ore tax but only whichever is the greater.

All these changes apply to the 1917 tax as well as to 1918 and have a very material effect on the amounts to be paid by the Companies.

"A little misunderstanding existed about the year's operations on which to base the returns. Some companies requested that they be allowed to pay taxes for 1917-18-19 on the basis of the 1917 returns, but when it was pointed out to them that provision was made in the Act to credit the 2 per cent. tax paid in the year that might be used as a base for income against said income tax they readily agreed to pay taxes for 1917 on 1915 balance sheet, for 1918 on 1916 balance sheet, and for 1919 on 1917 balance sheet, because by accepting this method their account for income tax for the 3 years would be credited with the 2 per cent. tax paid in the years 1915-16-17, while, if the tax for 1917-18-19 were based on the 1917 income, credit could only be had for the 2 per cent tax paid in that year.

"Gold mines were treated a little differently on account of the price of gold being fixed and the increased cost of production. The 2 per cent tax is struck out altogether, and they pay on their profits, without regard to whether or not the amount is greater than the 2 per cent. tax. The only other deduction that the mining companies can reasonably ask for is that the capital invested be allowed to earn a reasonable interest before profits are taxed, but this would also have

to apply to lumbering and other industries. We are in sympathy with the idea, but before arriving at a decision on the point we are waiting for complete returns from mining companies and other corporations, so that we may have sufficient information before us to see what effect such deductions would have on our revenue.

"It is hardly necessary for me to again repeat that Premier Oliver and the Government are determined that taxation shall not interfere with the progress of mining in this Province and when your returns are all in our possession we will give the matter our fullest consideration and study, so that adjustments may be made, if necessary."

Mr. R. Randolph Bruce, of the Paradise Mine, Windermere, followed with an acknowledgement of the courtesy and consideration given the representatives of the Mining Industry by the Government in discussions on taxation.

On Wednesday morning (July 10th) Mr. R. F. Green, M.P., spoke briefly and Mr. S. G. Blaylock, of Trail, B.C., assistant general manager of the Canadian Consolidated Mining and Smelting Co., gave an interesting address on "The Part Played in the War by the Trail Smelter." He spoke of the development of the lead and other branches of the smeltery since the outbreak of the war and made the statement that facilities had been provided for the handling of all the ores of the Province.

Hon. Wm. Sloan on Mining Industry of B.C.

Mr. A. B. Clabon, president of the Vancouver Chamber of Mines, took for his subject "The Value of the Mining Industry" and in the afternoon Hon. Wm. Sloan, Minister of Mines, delivered a spirited speech on "British Columbia, the Mineral Province." He extended a special welcome to the visitors from the United States, speaking of the value of co-operation and of the fact that at such a time, when Canadians and Americans were fighting shoulder to shoulder against the common enemy, their fellow-countymen at home should and would "do their bit" by pooling their interests, so to speak and by concerted effort attain the maximum output of those materials essential to the successful prosecution of the war. He traced the development of the mining industry in British Columbia from 1848 when the Hudson's Bay Co. first mined coal on Vancouver Island. Since then \$170,000,000 worth of coal had been dug up in the Province. British Columbia, contemptuously referred to as a "Sea of Mountains," had yielded \$80,000,000 in quartz mining in the last three years. California mining wealth had produced a record of \$37 per capita whilst British Columbia had a record of \$115 per capita and its resources were only scratched. He dealt with what the Government had done to assist the prospector and with taxation, "taxation and legislation" being referred to as the bugbear of the miners. Personally, he disapproved of the 2 per cent. tax, favoring taxation on the net income of the mines. Reference also was made by the minister to the Government's policy of encouraging the development of the iron ore resources of the country. British Columbia, he said, lacked experimental plants. What was wanted was a plant combining both the commercial and the experimental and the Federal and British Columbia Governments would work towards the establishment of such a plant.

"Northwest Kootenay" was the title of an address by Mr. Orville Young, M.E., of Golden, B.C.

Mr. F. A. Starkey, of Nelson, B.C., President of the Eastern British Columbia Associated Boards of Trade,

subject being "Closer Co-Operation Between Boards of Trade and Mining Organizations." He regretted the lack of a better understanding between the mine-owners and the Trail Smeltery and thought that the former by presenting a united front would be able to obtain redress from the smeltermen.

Before the noon adjournment a Resolution Committee was appointed, composed of Messrs. R. Randolph Bruce, Golden, B.C.; Sidney Norman, Spokane, Wash.; Andrew M. Craig, Trout Lake, B.C.; F. A. Starkey, Nelson, B.C.; and J. W. Evans, Revelstoke, B.C.

The prospectors' luncheon which followed and of which nearly one hundred delegates partook, was unique as well as appetizing, features of the menu being bacon, beans and bannock.

In the absence of Mr. Thomas French, manager of the French Complex Ore Reduction Co., Nelson, B.C., his paper on "Some Notes on the Smelter Situation in British Columbia," was read by Mr. F. B. Hill, the Convention secretary. A vigorous address strongly protesting against the evils of the smelter trust was delivered by Mr. Sidney Norman, editor of the "Northwest Mining Truth" and the representative, on this occasion, of the Spokane Chamber of Commerce.

Mr. J. J. Warren on Smeltery Problems.

Mr. J. J. Warren, of Trail, B.C., president of the Canadian Consolidated Mining and Smelting Co., whose address was entitled "Some Smelting Problems under War-time Conditions," summed up the difficulties with which the smelter has had to contend and warmly defended its management against statements made by some of the speakers. He spoke of the difficulty of finding labor, of the increased cost of production for various reasons among those cited being coal strikes, which restricted operations, and of the problem of fixing smelting rates. In regard to the latter, he instanced the inability of the mine operators to supply the lead demand of the winters of 1916 and 1917, as a result of which an effort had to be made to meet the demand from the American side. When, however, war needs were satisfied the smelter found itself without a market, and, the lead market having collapsed, the smelter had a surplus on its hands. Shortage of clean lead in British Columbia for smelting purposes was the great difficulty. He resented the suggestion that the company was not treating the mine operators fairly. If it was to be subjected to Government regulation the same action should be taken with saw-mills and flour mills. The smelter was ready to treat lead at \$1.00 over cost, which, he believed, was a better rate than was quoted by any other smelter on the continent.

Mr. Charles F. Caldwell, of Nelson, B.C., president and manager of the Utica Mines and President of the Kootenay Mine Owners' Association, outlined the claims of the mine owners of the Kootenay District with respect to smelting rates and asked for the sympathy and the support of the Convention and the Boards of Trade of British Columbia.

In closing the Convention considered the following resolution, in addition to passing those of the usual formal character:

"That inasmuch as the Consolidated Mining and Smelting Company is treating custom ores and may be considered a public utility; that a Royal Commission be appointed to investigate and regulate treatment and smelter charges, guaranteeing fair and equal treatment to all producers."

It was decided, on amendment, to defer action pending consideration of the matter by the Associated

How the Trail Smelter Has Helped to Win the War

One of the features of the discussion which took place at the Annual Northwest Mining Convention held at Revelstoke, B.C., from July 9 to 12, was Mr. S. G. Blaylock's address on "The Part Played in the War by the Trail Smelter." Because of his position as assistant General Manager of the Consolidated Mining & Smelting Co. and owing to his high standing in British Columbia mining circles his observations were based on an intimate knowledge of his subject and were listened to with profound attention.

He said that no better illustration of the work done for the British Empire by the company could be found than the giving of a rough outline of the zinc industry. The problem to be solved was how to separate the zinc from the lead in ores. Although this matter had received close attention and endless experiments had been made, when the war broke out the company was only making one half ton of zinc a day. To quote Mr. Blaylock:

"The Imperial Munitions Board was in dire need of high grade zinc, which was selling at from 35 to 45 cents a pound, when obtained at all. Besides this, it appeared to be cornered by our enemies. It was on this account that the company agreed to build a plant, based on our experimental work, to make twenty tons of zinc a day, at a price of 15 cents a pound, or less than one-half of the current price. This was rapidly followed by demands for a larger and a still larger production, but at the same price a pound of zinc.

"Before the plant could be designed and orders placed, preliminary quotations on many things were doubled.

"The plant required proved to be more extensive than was originally thought sufficient. Sulphuric acid was prohibitive in price, necessitating the installation of a sulphuric acid plant, and many other difficulties arose and were overcome, till finally the plant was completed and in operation. Hundreds of difficulties were experienced when the big plant started which did not show up in the small experimental unit. These were met and surmounted by the most incessant work of those in charge.

"Some of the main points of the process as carried out are the counter-current leaching, the neutral solution by addition of an excess of ore—in other words, a double leach; the drastic purification of solution; the development of suitable pumps and air lifts for handling solids and solutions; the proper content of the electrolytic tanks to prevent the breaking up of the electrolysis and the formation of hydrogen; and also the keeping down of the volatile and the development of efficient melting furnaces.

"Much work has been done on the residues and we feel that we soon will be in a position to treat these successfully, the trouble to date being to get the zinc in these tails sufficiently low to allow of their profitable treatment for lead and silver.

"The Government aided in financing the company to the extent of lending about 30 per cent. of the money necessary to build the plant. This money, however, was merely a loan and has to be repaid in full. A bounty was also promised and has been extended, which would ensure a price 2 cents a pound better than the price of prime western spelter, unless the price of this grade was 9 cents a pound."

It, therefore, will be seen that the starting of this electrolysis plant at Trail, B.C., together with that

which was established almost simultaneously at Anaconda, Montana, had a strong bearing, and probably was the determining factor, in the bearing of the German hold on high-grade zinc.

Mr. Blaylock, continuing, said that in order to assure the greatest possible output of lead for the Imperial Munitions Board, the company took all the customs ore offered in the country until the Board notified the company that it could handle no more. In order to accommodate this customs ore, which had increased from less than thirty tons a day, when the metal markets were low at the start of the war, to over 200 tons a day, when metals were high immediately prior to the cancellation of their contract by the Munitions Board, it was necessary to curtail shipments from the company's own properties to a minimum, thus losing the advantage of the high price of lead, but contributing greatly to the ultimate winning of the war.

In enumerating some of the calls made on the company during the crisis, Mr. Blaylock said:

"The Consolidated was also requested to build a refinery for the production of copper. While this refinery is comparatively small, its building and operation in conjunction with the necessary converter plant was a large undertaking for a company which had lost so many of its best employees who had answered the country's call for men to go overseas."

GRANBY COMPANY INCREASES WAGES.

The Granby Consolidated Mining & Smelting Co. has advanced wages to all employees at its smelter 25 cents a day as from the 1st of July. The increase was the result of the rise in the price of copper, which went recently from 23½ to 26 cents a pound, and is in accordance with an agreement between the Granby Company and its men. The men now receive \$1.25 a day above the normal wages, which are based on copper at 16 cents. Although copper has been 23½ cents for the past year the company has paid its men on a basis of 24 cent copper.

GRANBY EMPLOYEES ON STRIKE.

About 2,000 men are affected by a strike declared by employees of the Granby Consolidated Mining and Smelting Co. at Anyox, B.C., the mining and smelting centre of that company in British Columbia. An increase of \$1 a day all round is the men's demand. The management of the company, in a statement issued immediately following the trouble, allege that it was fomented by I.W.W. agents. It is maintained that the wages paid are as high, or higher, than are paid anywhere else in America for the same service. Common laborers receive \$4.75 for eight hours, which is claimed to be higher than is given anywhere else in the Province. Ninety per cent of the men, it is stated, are living in the rooming houses and eating at the mess houses, where their living only costs \$7.50 per month more than it did before the war. Their wages have been increased \$50 to \$60 a month. In this respect they are better off than the married men, although the latter, because of the fact that the company is selling supplies through its store at less than retail prices elsewhere, are able to live comparatively cheaply. The foregoing is taken from the company's statement, which adds that the wage increase during the past four years is double the increase in the cost of living. At the time of writing (July 23rd) the men appeared to be determined and were being supported in Vancouver, B.C., where notices had been posted at labor headquarters warning workers to remain away from Anyox during the strike.

International Nickel Co.'s Refinery at Port Colborne

On July 1st, 1918, the plant of the International Nickel Company of Canada, was put into operation for the treatment of nickel-copper matte. A large supply of matte has been shipped to this refinery during recent months from Copper Cliff, where it is produced at the smelter of the Canadian Copper Company. The bins have also been well stocked with fuels and salt cake. The first operation—smelting the matte with salt cake—is now being carried out in one of the three furnaces. It will take a few weeks to fill up the plant, and then the production of refined nickel on a large scale will have begun. The plant was designed to produce about fifteen million pounds of nickel per year. There will

The Foundation Company, Ltd., of Montreal, had charge of the entire construction. From four to nine hundred men were employed on this work. The buildings are of steel and brick construction. The Dominion Bridge Company, of Montreal, supplied, fabricated and erected the steel—about 10,000,000 pounds. About 51,000 tons of concrete and 6,000,000 bricks were used on the work.

The first view of the works shows two enormous and three smaller stacks rising from a well-laid group of brick buildings. Approaching the plant from Port Colborne, we find a handsome office at the end of a court flanked on either side by very attractive club-lodging



The new nickel refinery at Port Colborne, Ont.

be produced at the same time about half this amount of copper. There is at present no provision for recovering the precious metals at the Port Colborne plant, and the slimes will be sent to the New Jersey refinery of the International Nickel Company for treatment.

The site selected for the refinery is at Port Colborne, adjoining that of the Canadian Furnace Company. It is close to the Welland Canal and to a branch line of the Grand Trunk Railway. Port Colborne is on Lake Erie at the entrance to the Welland Canal, and the transportation of fuels by water will, therefore, be possible.

houses. At the left of the office is the hospital and time-recording office. At the right is the laboratory building.

The railway sidings enter the yard from the north, the main supply line leading to the bins at the east side of the furnace building. The approach to the bins is over a very substantial concrete trestle. From these bins the matte, fuel and salt cake are loaded into cars resting in pits in the concrete floor of the building. These cars are hoisted to the feeding floor.

The furnace building is a large one—746 ft. by 125 ft. It houses three blast furnaces and three converter

stands. These are served by seven travelling cranes—two five-ton, 30-ft. span; three 2-trolley, 20-ton, 85-ft. span; one 2-trolley, 35-ton, 85-ft. span, and one single-trolley, 50-ton, 85-ft. span. The furnace stack is an enormous one—365 ft. high.

A similar large stack serves the roasting furnaces. There are 10 of these in the oxide department.

In the refining building are two refining furnaces with waste heat boilers. One 15 ton 2-hoist and one 5-ton single-hoist cranes serve the furnaces. There are two stacks 100 ft. high.

The power house contains four 400 h.p. boilers with chain grate stokers and two 1,000 k.w. turbo generators. A very complete Cottrell precipitation plant treats the fumes from the furnaces.

Altogether the plant is a very imposing one. It is the result of careful planning after long experience.

PERSONAL

Mr. Thomas Taylor, formerly overman at the No. 5 Mine, Comox Colliery, operated by the Canadian Collieries (D), Ltd., has accepted a position as overman of the Morden Mine, operated by the Pacific Coast Coal Mines at South Wellington, B.C.

Mr. W. H. Moore, formerly safety inspector for the Canadian Western Fuel Co., has been appointed manager of the new Wakesiah Mine, now being opened by the same company.

Mr. J. Jemson,, overman of the South Side No. 1 Mine, Nanaimo Colliery, operated by the Canadian Western Fuel Co., has been appointed Safety Inspector to succeed W. H. Moore in that position, and Robert Laid has been made overman to succeed Mr. Jemson.



The new nickel refinery at Port Colborne, Ont.

The contractors have done their work well and it is reasonable to expect that the plant will prove so suitable for its work that it will be extended so that all the refining for the International Nickel Company will eventually be done at Port Colborne.

We have given here only a brief account in order to give our readers some idea of what the buildings shown on these pages contain. In a later issue we will present a more technical description of the plant and its construction.

Mr. John More is general manager and Mr. James T. Kemp assistant general manager at the Port Colborne plant. There are at present about 350 men employed.

Col. Jos. W. Boyle, who has been doing important work for the Allies in Russia, has been decorated by the King of Roumania for saving a number of Roumanians from exile and probably death at the hands of Russian Bolsheviks.

Major R. W. Brock has been appointed geological expert in Palestine by the British Government.

Prof. R. C. Wallace has been appointed Commissioner for Northern Manitoba.

Prof. J. S. DeLury of the University of Manitoba was in Toronto last week.

Mr. E. J. Collins, of Duluth, visited the Flin-Flour district, Manitoba, last week.

INVESTIGATION OF SMELTERY CHARGES IN BRITISH COLUMBIA.

The promised investigation into the affairs of the Canadian Consolidated Mining and Smelting Co., with special reference to its schedule of charges in connection with the Trail Smelter, still hangs fire. Over a month ago it was thought that the inquiry would proceed, a committee, appointed by the Associated Boards of Trade of British Columbia, having been endorsed by the Dominion Government, which evinced its practical interest by retaining Mr. E. R. Whittaker, of Denver, Colorado, the mining engineer who compiled a report of a recent commission appointed to deal with similar business in Colorado, and also voted \$3,000 towards the expenses likely to be incurred. Messrs. S. S. Fowler, Ivan de Lashmutt, and James Anderson were those named; Mr. W. E. Zwicky being selected to act in an advisory capacity. There was some delay in getting the committee together following the Dominion Government's action, owing to the illness of Mr. Fowler, but finally a meeting took place. The deliberations were short, coming to an untimely conclusion, when it was found that \$3,000 would be much too little to carry through the work and that the committee had no authority to hear sworn testimony. It was decided, therefore, to petition the Dominion Government to appoint a Royal Commission, with power to go fully into all disputed points as between the company and the mine operators of the Province. To make a thorough inquiry, it is the opinion that \$10,000 at least will be wanted, and the Government has been asked for such an appropriation. While nothing definite has been learned, reports of an authoritative character have been circulated to the effect that the Federal authorities have decided to accede to the demands of the operators and that the Commission will be established in a short time. It may be said incidentally that the recent action of the Dominion Government in setting aside \$400,000 to provide for what is termed a bounty on the production of zinc in Canada has resulted in the development of a somewhat stronger feeling against the Canadian Consolidated Company, because the latter will obtain the entire benefit. Operators of mines which produce ore carrying large percentages of zinc, maintain that the Government vote should be termed a subsidy, as it will go altogether to the company. On the other hand, it is argued that, as the company went to considerable expense in the installation of its electrolytic plant, it is entitled to the support granted. The mine owners contend that the stimulation of the production of zinc should have been carried out as was that of lead, namely, by the granting of a bounty on the basis of the zinc contents of the ore mined, the same to be established by assay.

McGILLIVRAY COAL AND COKE CO.

At the annual meeting of the McGillivray Coal and Coke Company held at Coleman, Alberta, recently, Mr. Lorne A. Campbell, formerly Minister of Mines for British Columbia, was re-elected president; Mr. J. A. Newell, of St. Paul, Minn., vice-president; and Mr. C. B. Smith, secretary-treasurer. The officers, with Mr. Henry L. Simons, of Glencoe, Minn., and Mr. Fitzhugh Burns, of St. Paul, Minn., were elected to the directorate. Much of the stock of this company is held in Spokane, Wash., and the adjacent district.

VANCOUVER ISLAND COLLIERIES ARE PERMITTED TO RAISE PRICE OF COAL.

Permission has been granted by Fuel Controller C. A. McGrath of Canada to the following Vancouver Island (B.C.) Collieries to advance the selling price of their coal seventy-five cents per gross ton: Canadian Collieries (Dunsmuir) Ltd., The Pacific Coast Coal Mines, Ltd., The Nanoose Collieries, Ltd.

The maximum allowed heretofore at the mines has been \$5.80 per gross ton and to this the Canadian Western Fuel Co., Ltd., at present the largest of the Island producers, is held by the ruling of the fuel administrators.

An application for this concession was made to Fuel Controller McGrath by the operators some months ago and, pursuant to the policy inaugurated in the Provinces of Nova Scotia and New Brunswick, an investigation of costs and of general conditions was ordered and entrusted to Mr. Kerr, the Fuel Control Auditor; and Mr. Nichol Thompson, Fuel Administrator for British Columbia. In carrying out the inquiry they had the co-operation of Mr. George Wilkinson, Chief Inspector of Mines for British Columbia.

The announcement of the advance authorized was accompanied by a statement, one paragraph of which explains the action of the Administrators in differentiating between collieries, the most notable instance of which is the withholding of permission to the Western Canadian Fuel Company to increase prices at the mine. This paragraph follows:

"As can readily be appreciated, some coal operators are placed very favorably as compared with others in the same province. This may be due to better coal seams or other more advantageous conditions attending the practical operations. The Fuel Controller fully realizes that the country requires all the coal that can be produced. At the same time he has decided that in granting permission to increase the selling prices, there will be allowed only fair and reasonable profits. The result is that in order to procure the best possible output and at the same time to avoid any operator making undue profits, it has been necessary in some instances to have different prices prevail at different collieries which supply the same markets. In the case of the operators on Vancouver Island a differentiation in prices has been necessary in order to meet the situation there."

OPENING SMALL COAL MINES TO SUPPLY LOCAL TRADE.

The present demand for coal, and the prospect of a much greater demand in the course of the next few months, has led to an interesting development in both Alberta and British Columbia. Coal properties are being opened up by individual miners in both Provinces and are giving their enterprising operators good returns. There are quite a number of these propositions in Alberta, a few men being engaged in the summer in digging the lignite coal, which, in the winter, is carted over the snow by sleigh to the farmers and other residents within reach. In British Columbia a bituminous mine has been opened on the line of the Grand Trunk Pacific Railway and a short distance from the city of Prince Rupert. It is being worked by a few coal miners who are looking forward to supplying the Prince Rupert market this winter, the proximity of the property to the city making it possible to effect delivery at a much cheaper rate than it can be obtained from the mines of Vancouver Island and of other sections of the Province.

R. C. WALLACE IS COMMISSIONER OF NORTHERN MANITOBA.

The Pas, Man., July 12.—Professor R. C. Wallace, M.A., D.S., Ph.D., head of the Department of Geology and Mineralogy of the University of Manitoba, has been appointed to succeed John A. Campbell, member of Parliament for Nelson, as commissioner of Northern Manitoba.

Prof. Wallace is well known by miners and mining men generally throughout the Northland, having been through the whole known mineral district adjacent to The Pas. His reports to Government of researches in Northern Manitoba have been very favorable to this region as a positive mining centre, only awaiting development.

Other duties pertaining to the office are the supervision of education, of health and to act as a judge where necessary. His jurisdiction covers an area of nearly 200,000 square miles.

Professor Wallace and his family will take up their residence in The Pas after December 1st, on which date he assumes his new duties.

IVANHOE MINE, B.C.

The Rosebery-Surprise mining company is reported to have taken a bond on the Ivanhoe Group, the property of the Minnesota Silver Co., largely owned by Mr. W. H. Yawkey, of New York. The deal includes the concentrator which was put up by the Surprise company, under agreement with the Minnesota Silver Co., to replace the mill destroyed by fire several years ago. Work on the Ivanhoe has been started by the Rosebery-Surprise forces according to a statement by Mr. McFadden, the manager, who adds that negotiations are under way for the acquisition of the Canadian group, adjoining the Ivanhoe, and owned by Brandon Bros., of Silverton. Mr. D. McKenzie, formerly superintendent of the Ruth Mines, will be in charge of operations at the Ivanhoe. Considerable shipments were made from the Ivanhoe several years ago, but the mine did not prove profitable under the then prices of metals. Most of the mine product is milling ore.

UNDERSTANDING BETWEEN GRANBY AND CANADIAN COLLIERIES.

It is understood that the Canadian Collieries (Dunsmuir), Ltd., and the Granby Consolidated Mining & Smelting Co., Ltd., either have or are about at the point of reaching an agreement as to the coal lands in dispute situated in the Esquimalt & Nanaimo Ry. Belt on Vancouver Island, British Columbia. These lands, as has been explained previously, are held by the Granby Company under title from the Province, which title was acquired from certain settlers who secured it by virtue of the Settlers' Rights Amendment Act, 1917. Subsequently this Act was disallowed by the Dominion Government, and the Canadian Collieries Co. claimed title, having acquired the Island coal lands granted to the E. & N. Ry. Co. in 1884. Believing their title sound, the Granby Co. had prospected for and found coal. They then went to an expense of approximately \$300,000 in opening up the seams and in installation of plant on the ground. Further outlay was undertaken in the installation of by-product coking ovens at Anyox, B.C., where it is proposed making coal from the Island coal for the Company's smelters. It was feared that the Dominion Government's action would result in the cessation of this development while the two companies engaged in a lengthy law-suit to

concerns are likely to arrive at a mutually satisfactory agreement is welcomed in British Columbia.

PLATINUM ON KASLO RIVER PROPERTY.

Norquist Brothers, of Spokane and Seattle, owners of the Gum and Nome group of claims on the south fork of the Kaslo River, are credited with having made the important discovery that their property has possibilities as a platinum producer. Twenty years work and \$28,000 are said to have been expended in a vain effort to prove a silver mine, hundreds of feet of tunnel being driven in the course of which good showings repeatedly were found and lost. Last year the owners despaired and were contemplating abandoning the claims. At this point one took a sample of what seemed to be peculiar rock which projected from the face of the drift. He had it analyzed and, report has it that the returns showed the occurrence of platinum to the extent of about \$700 to the ton. A little of this at the prevailing price of \$105 per ounce would soon wipe out the property's indebtedness and the owners have reopened with renewed optimism.

The Rex Mine have made their second monthly shipment of bullion, amounting to over \$6,000. The drift in the 100-ft. level is now 130 ft. south of the shaft, and the vein is six feet in width. The ore continues to show its usual consistent satisfactory gold content.

Archie Close has almost completed the enlargement of the shaft on the Northern Manitoba Co.'s property, and expects to start work on the sinking of the shaft next week.

Mr. Cram, of Rossland, B.C., and J. MacCutcheon, returned from Herb and Elbow Lakes on Friday, with samples from various properties around Herb Lake. Paul Gasse came in also, and is now negotiating with Eastern capitalists, with a view to granting them an option on his property. Hugh Vickers located a rich, small vein about a mile north-east of the new find. Samples show much free gold. John W. Callinan is in from Flin-Flon district. J. G. Cameron, of Regina, arrived in town the beginning of this week, and has gone north to Copper Lake, north of Cranberry. He has copper propertites in that locality. Six carloads of copper ore from the Mandy Mine were sent to B.C. on Wednesday's train. About 750 tons of Mandy Mine ore came down this week.—The Pas Herald.

STRONTIANITE DEPOSITS ON ASHNOLA RIVER, B.C.

Deposits of strontianite have been found on the lower Ashnola River, B.C. No development work of consequence has been done as yet, but the discoverers believe that there is a considerable body of the ore. Owing to the special uses to which the mineral is being put within the war area, its value as a means of signalling being one of the most notable, the prospect has attracted more than usual attention.

On account of the cutting off of the supply of platinum from the Urals, Great Britain and her Allies are now forced to look to other sources for that metal which is so urgently needed for war purposes. In order to stimulate production in Canada, the Department of Mines, the Honorable Martin Burrell, Minister, has arranged for the purchase of platinum at the Dominion Assay Office, which the Department maintains in Vancouver. The establishment of this purchasing agency will be a great convenience to miners, particularly to small producers, who heretofore have had to market their product in the United States with con-

COAL MINER ACCUSED OF DRAWING DOUBLE PAY.

A criminal action was heard in the coal mining town of Fernie, B.C., last week, which created something of a furore there and held the attention of coal mine operators and coal miners throughout the province. The circumstances, in a few words, were that a miner employed by the Crow's Nest Pass Coal Company was accused of loading a number of cars and placing his tally check thereon while supposed to be on company work and paid by the company. Thus he got double-pay—pay at the stated rate for company work and pay, under the contract system, for the coal loaded which in the ordinary way was credited to him. Witnesses for the defence testified in effect that it frequently happened, so frequently as to be almost a custom, that sub-officials would allow contract miners, while working on company time, credit for coal loaded by time on contract basis in addition to the regular schedule for the company shift. It was alleged that the motive for this was to "speed-up" the work by hastening the expeditious completion of necessary work and avoiding undue interference with production. On the other hand company officials and sub-officials entered an emphatic denial of the existence of such a system. The secretary of the local union declared that it was a common practice, but repudiated it, stating that it was not done with the approval of union officials. The Court in fining the accused \$100 or six months in jail said: "If this custom did exist, it is a criminal one. I do not care if a few overmen or fire-bosses connived with the workmen; it was a criminal one undoubtedly. I do not share Mr. Phillips' (witness for the defence) Bolsheviki idea that it is all right to steal from your employer, but not from your fellow worker. I do not think any right thinking man will agree. But, as I say, if it was a custom, it was a criminal one and one a man should be punished for."

WESTERN CANADA'S COAL SUPPLY.

The question of next winter's coal supply begins to loom large in the minds of the citizens of Winnipeg, Manitoba, and other parts of that Province, as well as of Saskatchewan. A few weeks ago a committee representing the city of Winnipeg visited Calgary, Alberta, for the purpose of going into the matter of coal costs with the operators of the latter Province, it being contended that, if Manitoba is expected to use Alberta coal, it will have to be put on the market at a cheaper rate than the present retail price, namely, from \$11.50 to \$12 a ton. The delegates do not appear to be satisfied with the results achieved, stating that the operators did not evince a willingness to assist in their work, nor to show any strong desire to establish their product in the markets of Manitoba. The information they got was summed up as follows: That the coal costs on cars at the mine was \$4.95; that the freight to Winnipeg was \$4.15; and that administration and cartage accounted for another \$2. In the face of this, it is admitted that there does not seem to be any indication of profiteering; but the members of the committee expressed disappointment that the mine owners had not thrown open their books for inspection in order that these statements might be confirmed. The difficulty, however, was agreed to be the high freight charges and Mr. S. C. Oxton, deputy minister of public works, Manitoba, and Mr. J. A. McDonald, acting fuel administrator for the Province of Manitoba, recently interviewed the fuel administrators of Alberta with a view to finding some means of bringing about a reduction in the transporta-

toba are debating whether it would not be as cheap to pay \$14 a ton for the high-class anthracite of the U. S. as against about \$12 for the bituminous coal of Alberta. There is no doubt what their decision would be, but for the fact that they have been cautioned that the United States this winter will have use for its full production of coal and that the prospect is that there will be little available for export to Canada.

In answer to the statements of the Winnipeg representatives, Mr. Jesse Gouge, one of the operators of the Drumheller field, Alberta, states that, if they return and state that Alberta coal costs \$4.95 a ton, they will not be telling the whole truth. He adds: "Four dollars and ninety-five cents is the maximum price for the very highest grade double-screened coal produced in the Drumheller field. Good coal, mine run, can be purchased for \$3.35 a ton; good lump coal, run over single screen, at from \$4.50 to \$4.65 a ton; good screen coal may be had for \$3.75 a ton; nut, screened coal for \$2.40, and steam coal, good for boilers and for heating big buildings, may be had at from 25 cents to \$1 a ton." Mr. Gouge further pointed out that Winnipeg had use for all grades of coal, just as was the case in Calgary, and that coal costing only 25 cents a ton was being used in the Calgary City Power Plant. As to the charge that the committee members were not allowed to inspect the operators' cost book, he stated that it would have been absurd to permit men with little knowledge of coal and no authority outside of the City Council of Winnipeg such a privilege as the likely result would be the dissemination of misinformation. The owners were quite willing to throw open their records to a properly constituted Government body.

LADYSMITH SMELTER.

Some weeks ago it was stated in these columns on the authority of Mr. W. J. Rattle, general manager of the Ladysmith Smelter Corporation, that this British Columbia Smelter would be blown-in after some months of inactivity on the 20th of June, 1918. Because it was not possible to arrange definitely for a continuous supply of ore that programme was not carried out; but it now is stated that preparations are practically complete for the re-opening of the smelter with good assurance that its furnaces will be kept busy. The date now selected is the 29th of July. Besides being reported to have a bond on the Willow Grouse Mine, Cowichan Lake, the Ladysmith Corporation has secured the Girtwood Mine on Latouche Island, Southeastern Alaska. The latter is an old producer and in the past has shipped regularly to the Tacoma Smelter, its average for considerable periods being 1,000 tons a month. The property joins the Beatson, owned by the Guggenheim interests, and by reason of being near tidewater the transportation is simple.

THE WAKESIAH—A NEW COAL MINE.

The Canadian Western Fuel Co.'s new mine, situated near Nanaimo, B.C., and two shafts of which are being sunk to tap the famous Wellington Seam, will be known as the Wakesiah Mine. To reach the seam, the shafts must be sunk 350 feet. The concrete collars are in, and sinking has progressed to a depth of about 50 feet in the hoisting shaft. Plans have been prepared for the various buildings and machinery and mine yards. The mine will be up to date in every respect, and will be shipping coal before the end of the year. The company has three other producing mines, yielding a monthly tonnage of approximately 65,000 tons, and mining from three seams—the Douglas, Newcastle

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Rocher de Boule Strikes High Grade.

A shoot of ore of high grade, about seventeen feet in width, is said to have been struck by the Rocher de Boule Mining Co. on its property at New Hazelton, B.C. In the effort to locate this ore, a low-level tunnel was driven without result, but a streak of ore was noticed, and it was decided to raise on this. The shoot was encountered at an elevation of about 160 feet above the main level and, according to report, it has a great prospective value. A mill is to be erected to treat the lower grade of ore.

Prospecting for Platinum.

With further reference to prospecting for platinum in Western Canada, it is authoritatively reported that the Munition Resources Commission of the Dominion Government has a drill at work on the Saskatchewan River and another on the Peace River in British Columbia. The Tulameen River, of this Province, is to be thoroughly tested, two drills being on the way for operation there. It is understood that there already are two drills at work in the placer ground of this river.

Shipments to Trail Increase.

That the mining industry in British Columbia has been picking up in the last few weeks is indicated by the returns from the Trail Smelter for the week ending June 30th. These showed that 6,510 tons was received for treatment as compared with 3,233 tons for the week ending June 21st. The shipments by districts follow: Rossland, 1,807; Slocan and Ainsworth, 1,102; Nelson, 97; Boundary, 730; East Kootenay, 1,462; other mines, 96; American mines, 1,216.

Authoritative reports indicate that there is only a difference of 119 tons in the quantity of ore received by the Trail Smelter for treatment during the first six months of 1917 and the first half of the present year. The figures are: First half 1917, 179,493 tons; first half 1918, 179,274 tons. This showing is surprising, because the Rossland mines have been practically closed down, and there was a period of market depression and inactivity as far as the lead-silver-zinc mines of the Boundary, Slocan and Kootenay districts of the Province. It is thought likely that the revival, which is very evident at present, will result in much larger shipments over the remainder of the year and thus bring British Columbia's total production further up than was expected. The shipments by months follow:

	1917.	1918.
January	36,570	27,404
February	40,967	33,989
March	42,949	41,725
April	25,909	37,029
May	15,969	21,162
June	15,969	21,162

Totals 179,493 179,274

Prospectors Are Staking Claims Near Olivine Mountain

With further reference to the prospecting in progress in British Columbia for platinum Mr. Eugene Poitevin, a mineralogist attached to the Department of Mines, Ottawa, has returned after spending a few weeks at Olivine Mountain, near Tulameen, B.C. It is hoped that the source of both the gold and platinum of the Tulameen River placer ground will be found, as the character of what is being recovered along the rivers and streams of the district indicates that it has not

been carried a great distance. It is suggested that the Dominion Government may place a diamond drill in operation to prove some of the outcroppings in the mountain. That general interest has been aroused in the work is shown by the fact that there are many prospectors camped along the Tulameen river in close proximity to the mountain, and that quite a number of claims have been staked.

Western Gold Production Falling.

That some action should be taken by the State to encourage the production of gold is the consensus of opinion in British Columbia, where the effect of the ever-increasing cost of mining and of the augmented values of most minerals, with, of course, the exception of gold, has been felt to a serious extent. A notable case in point is the closing down of the Rossland Mines by the Canadian Consolidated Mining & Smelting Co. It is felt that, under the exceptional conditions, some effort should be made to maintain the output of gold, which is steadily declining in this Province. This is conclusively shown by the figures contained in the 1917 report of the Minister of Mines, as follows:—

British Columbia's output of placer and lode gold for the years 1915, 1916 and 1917: 1915, Placer 38,500 oz., value \$770,000; Lode, 250,021 oz., value \$5,167,934. 1916, Placer \$29,025 oz., value \$580,500; Lode 221,932 oz., value \$4,587,334. 1917, Placer 24,800 oz., value \$496,000; Lode, 114,523 oz., value \$2,367,190.

For this reason, a resolution passed by the Northwest Mining Association recently at a specially-called meeting, held at Spokane, Wash., meets with hearty approval here. The resolution is very clear in its terms and, while it refers specifically to conditions as they are in the United States, the principle enunciated is applicable and is accepted among mining men and those who have given the matter intelligent consideration in Canada. It follows:—

“That all war taxes be remitted insofar as they affect gold mining; That the present advance in freight rates be abrogated in respect to the gold mines that are unable to operate at a profit under the present rates; That commercially inaccessible gold properties of merit be made accessible through the building of motor roads; That the gold mining industry be placed on the same basis as other war industries in respect to financial assistance, to be extended through the war finance corporation or by means of re-discounts through the federal reserve bank, or through any other means that may be devised; That operators of gold properties be given Government guaranty, instead of a bonus, which guaranty shall assure to gold mine operators profits commensurate with those that would have accrued to them under the pre-war conditions and prices of labor, supplies, taxes and other items of general expense; That any and all Acts of the Government directed to the financial aid of the gold mining industry, as above set forth, shall be subject to the examinations, reports and recommendations of properly qualified mining and accounting experts acting on behalf of the Government; That copies of these resolutions be forwarded to Secretary McAdoo and to the senators and representatives of the various mining states.”

Britannia Mine.

At Britannia Mine the new mill is reported to be handling between 2,200 and 2,300 tons of ore a day. It is reported to be one of the most efficient on the continent, being credited with an extraction of between 94 and 95 per cent. The company has opened what is termed Mammoth Bluff as a quarry which marks the

commencement of the mining of Britannia Mountain. The greatest problem in connection with the operations is the shortage of labor. There now are only approximately 850 men on the pay-roll, as against a normal pay-roll of 1,000. The company is planning to place its entire system of ore transportation underground.

Oil Prospecting in British Columbia.

Considerable interest is being taken in oil prospecting in British Columbia. Had it not been for the untimely death of Mr. B. T. Rogers, capitalist, of Vancouver, B.C., work would have gone forward in the sinking of a test hole at Burnaby, where there are oil seepages. It is reported by the Empire Oil and Natural Gas Co., Ltd., that a drill has been sunk to a depth of about 400 feet at Aldergrove, B.C., the latest log showing a sandy shale. There have been two companies organized at Vancouver, namely, the Boundary Bay Oil Company, Ltd., and the Burnaby Oil Co., Ltd. The former intends to test by drilling an area at Boundary Bay and the latter to carry out work at Vancouver Heights. The possibilities of Graham Island, of the Queen Charlotte group, also are engaging attention. It is understood that the Geological Survey Station proposes this summer to make a thorough examination of the Fraser Valley, so as to establish at what point a drill would be most likely to strike oil in commercial quantities.

Annual Report of Minister of Mines.

The annual report of the Minister of Mines of British Columbia for 1917 has been issued. It is the first to contain reports from the district mining engineers who were stationed in different sections of the Province during the past year. Figures given relating to production proved that the preliminary estimates published months ago were very close to the mark, the estimated production for the twelve months being \$37,182,500, as against a definitely established total of \$37,010,392.

Vancouver Island, B.C.—A considerable amount of ore is on the dump at the Monitor Mine, Alberni Canal, Vancouver Island, waiting shipping. Difficulty is being experienced in obtaining shipping facilities.

A spur is being built by the Sunloch Mining Company from its property to the Vancouver Island Power Company's tramway at Jordan River and arrangements are being made for the shipment of ore to the Tacoma Smelter.

Two shifts, with a total of 40 men, are being worked by the Cork Province Mine on the south fork of Kaslo Creek, B.C. There is a mill in operation.

Action is being taken by the officials of the Dominion National Park to stop mining operations within the park area in that section, which will interfere with plans in hand for the development of the Dunvegan group of claims situated on the divide between the Illecillewaet River and the head of Fish Creek. The operators consider this unfair as the claims were located about twenty-five years ago before the establishment of a park area.

PYRITES.

A recently published report by P. S. Smith, of the U.S. Geological Survey, on pyrites is, in part, as follows:—

The term pyrites is the indefinite general trade name for any of the iron sulphide minerals, such as pyrite, marcasite and pyrrhotite. Pyrite and marcasite when pure have identical chemical composition, namely, about 53 per cent. sulphur and 47 per cent. iron, but differ from each other in mode of crystallization. Pyrite forms cubical crystals, whereas marcasite forms tabular crystals. Pyrrhotite when pure contains about 40 per cent. sulphur and 60 per cent. iron, it is somewhat softer, tarnishes more readily than either pyrite or marcasite, and is magnetic, whereas the other minerals are not.

Pyrites is used mainly for the manufacture of sulphuric acid, and more than 1,250,000 long tons is consumed in the United States each year for this purpose. Pyrites, as commercially used, is generally referred to one of two classes, lump or fines. The lump ore, as its name implies, consists of pieces more than half an inch in diameter, with a certain allowable proportion of smaller particles, and is used in the condition in which it comes from the mine, with little more than a preliminary crushing and sorting, according to size. The fines consist of smaller particles and generally have been obtained by crushing the ore so small that the pyrites can be separated from worthless gangue by some mechanical process. They are also derived from ore that has disintegrated as a result of leaching. Owing to the different methods of treating these two kinds of pyrites for the extraction of their sulphur, they can not be used interchangeably. The lump ore commands somewhat higher prices than the fines, but, of course, it is more difficult to obtain a lump ore with as high a sulphur content as that of fines. As a result, only a few mines or parts of a mine can furnish lump ore and maintain a sufficient sulphur content, whereas suitable fines may be obtained even from deposits in which the pyrites is sparsely disseminated.

No definite lower limit can be placed on the proportion of sulphur that a pyritic ore must contain to be of commercial grade. In practice, however, material containing more than 40 per cent. of sulphur is specified, and practically none of the acid companies use material that carries less than 35 per cent. of sulphur.

Several elements or substances by no means rare in pyritic ores are objectionable as material to be used in the manufacture of sulphuric acid and decrease the value of the ore in which they occur, or they can be used only by means of special treatment.

Certain elements, arsenic and antimony, for instance, are poisonous and have a bad effect on the resulting acid, but some of the large fertilizer plants do not reject an ore containing less than 1 per cent. of arsenic. These elements are also injurious from a manufacturing standpoint, if the pyrites is used in plants making acid by the contact process, as they attack the platinum and cause it to lose its efficiency. According to Wilson, pyrites carrying more than 8 per cent. of copper can not be profitably employed in the manufacture of sulphuric acid. Carbonaceous material, such as the coal adhering to the pyrites or "coal brasses," is apparently heavily penalized by acid manufacturers because it yields acid of a dark color. This effect, however, should not prevent pyrites containing some material of this sort being used in making some low-grade acids for the manufacture of fertilizers and similar materials.

On the other hand, however, most of the pyrites derived from the coal beds is marcasite, which decomposes readily, sometimes ignites through spontaneous combustion, or oxidizes to sulphuric acid, and is, therefore, a dangerous or expensive substance to leave in storage dumps.

The pyrites industry throughout 1917 showed an unsettled condition due largely to uncertainty as to whether importation of Spanish pyrites would be continued. At times the impression would be prevalent that further imports of pyrites would be stopped and there would follow a feverish interest in finding possible sources of domestic ore. Before much progress had been made in this search, however, a contrary rumor would be circulated and activities would decrease or actually stop. These conditions alternated in their hold on the minds of those who might have been willing to undertake the rather expensive and time-consuming operation of developing mines capable of supplying the sulphuric-acid industry with pyrites. Because of this uncertainty, some of the former users of imported pyrites decided to replace it with sulphur and thus reduce the quantity of imported ore required. This substitution required little change in technology in many of the plants and it was adopted by many manufacturers. By the last part of the year, however, it became evident that more domestic pyrites was necessary, and consequently several mines were opened. It takes time, however, to bring a pyrites mine to the producing stage, so that this activity had but little effect on the output of pyrites in 1917, but it will probably have a considerable effect on the output in 1918.

The shortage of pyrites was made evident by the high price that was paid for it and the difficulty of obtaining considerable quantities even at prices three times those paid in 1916. The quotations given for pyrites in the technical press in 1917 range all the way from 20 to 35 cents a unit for the sulphur content. On the assumption that the pyrites carried 45 per cent. sulphur, the latter price would bring a return of \$15.75 a ton for the pyrites. The usual pre-war price of pyrites was less than \$4 a ton, and, according to the statistics published by the U.S. Geological Survey, the average price per ton, even in 1916, was \$4.64.

The total value of the pyrites imported into the United States in 1917, was \$5,981,457, or an average value of \$6.18 a ton; in 1916 the average value was \$5.41 a ton. In this connection, it should be noted that in 1916 the price paid for Canadian ore was considerably lower than that paid for the Spanish ore. The value of Canadian pyrites was stated to be only about

two-thirds that of the Spanish ore. Some of this difference in price is warranted by the generally higher sulphur content of the Spanish ore, but some of the difference is caused by the unwillingness of the pyrites users to modify their old practice and to accept a substitute if Spanish ore is obtainable even at extra cost.

ANTHRACITE ALLOTMENTS FOR WESTERN CANADA.

In a memorandum issued on July 17 by Charles W. Peterson, deputy fuel controller for Canada, it is announced that Winnipeg is to have 65 per cent. of its normal supply of anthracite coal next winter. The remainder of the Province of Manitoba other than the City of Winnipeg and that portion of the Province of Saskatchewan east of approximately the 104th meridian, is to have 50 per cent of last year's consumption. To the cities of Moose Jaw, Regina and Saskatoon, 50 per cent. of last year's consumption is allotted.

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.50 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 12 cents per lb.

July 31, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 11 cents per lb.

Lead, 10¼ cents to 10½ cents per lb.

Antimony, 18 cents per lb.

Copper, casting, 30 cents per lb.

Electrolytic, 29½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

July 31, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$10.50 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

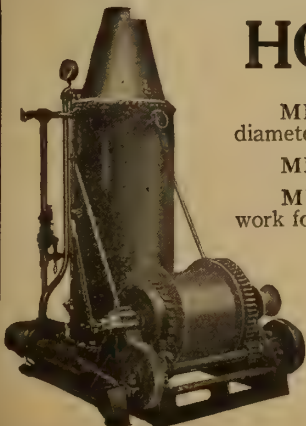
	New York cents.	London pence.
July—		
29	99½	48½

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Belev	4	3
Beaver Consolidated	25	23



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Gifford	2	1¾
Great Northern	3	2¾
Hargraves	4½	4¾
Kerr Lake	5.90	5.65
La Rose	40	35
McKinley Dar. Savage	39	38
Mining Corp. of Canada	2.50
Nipissing	8.50
Ophir	6¾	6¼
Peterson Lake	9	8¾
Silver Leaf	2	7½
Temiskaming	31	30½
Trethewey	22
Wetlaufer	4½

Gold.

	Sellers.	Buyers.
Apex	3	2½
Boston Creek Mines	20	..
Davidson Gold Mines . . . . .	..	25
Dome Extension . . . . .	..	10
Dome Lake	15	12
Dome Mines	9.40	9.25
Hollinger Cons.	4.75	4.60
Inspiration . . . . .	..	2
Keora	7¾	..
Lake Shore Mines, Ltd.	72	71
McIntyre	1.29	1.28
Moneta . . . . .	..	6½
Newray Mines, Ltd.	14	12
Porc. Crown	12½	10
Porc. Tisdale	1½	1
Vipond	13	11
Preston East Dome	3	2
Schumacher	20	17½
Teck-Hughes	15½	14½
Por. V. N. T. Gold M.	13	11
Thompson-Krist	6½	6
West Dome	9½	9
Wasapika Gold M., Ltd.	30	..

NEW YORK MARKETS.

July 20, 1918.

As quoted by Engineering and Mining Journal.

Copper, 26 cents.
Lead, 8.05 cents.
Zinc, 8.40 cents.
Tin—Banka, \$1.
Aluminum, 33 cents.
Antimony, 13¼ cents.
Bismuth, \$3.50.
Cadmium, \$1.50.
Nickel, 45 cents.
Quicksilver, \$125 to \$127½.
Silver, 99½ cents.
Platinum, \$105.
Palladium, \$135.
Iridium, \$175.
Chrome ore, \$1.40 per unit, f.o.b. California.
Molybdenite, about \$1.00 per lb.
Pyrates, 20 to 25 cents per unit f.o.b. mine.
Tungsten ore, \$18.50 to \$23.50 per unit.

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- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

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- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
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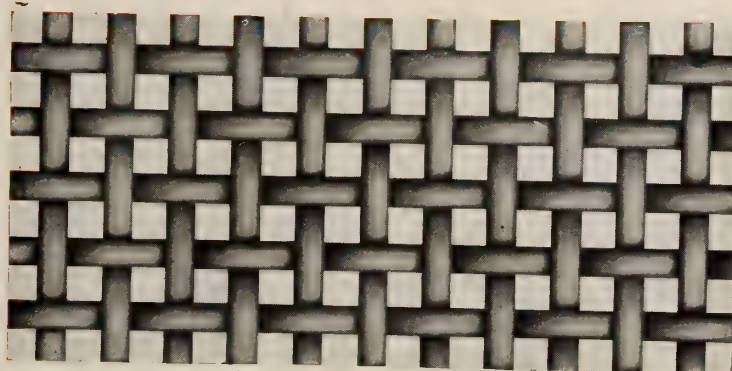
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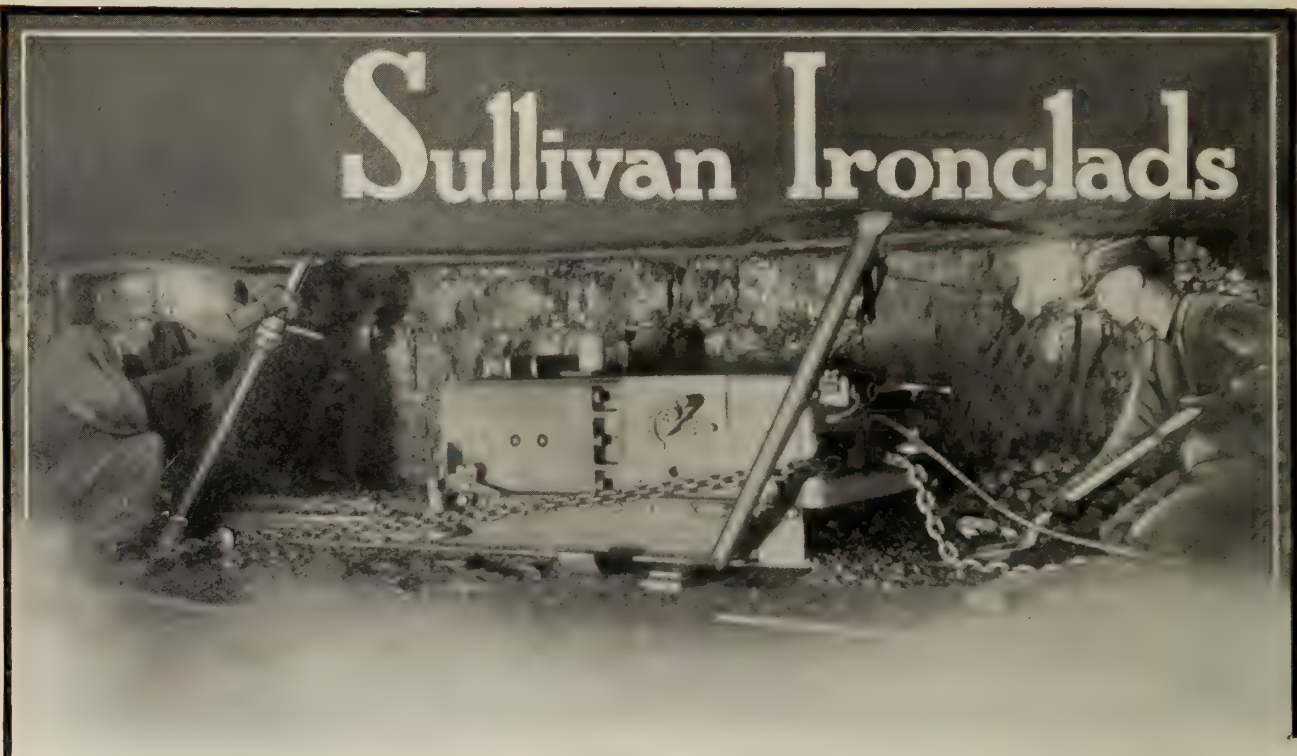
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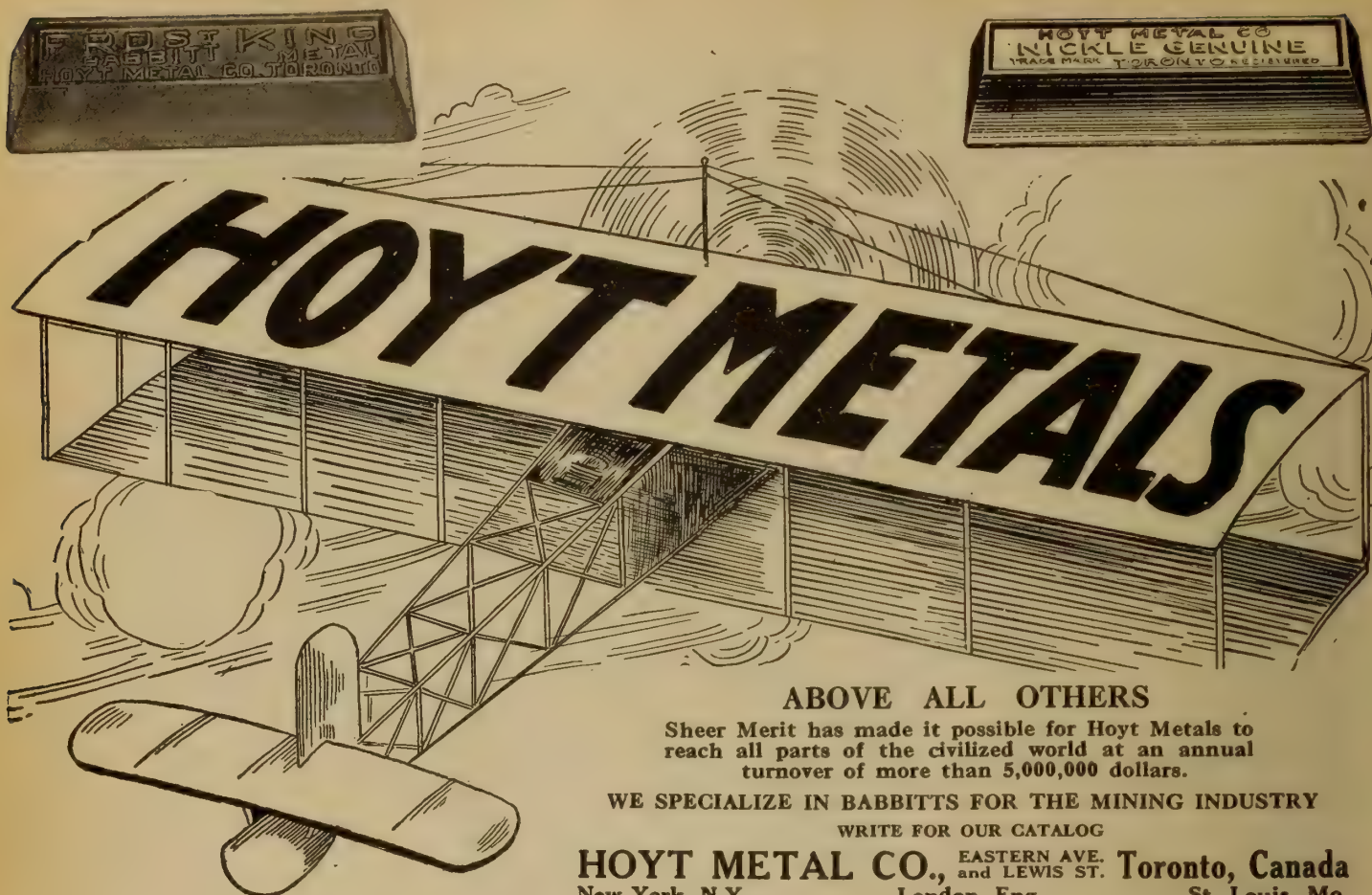
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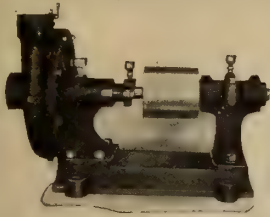


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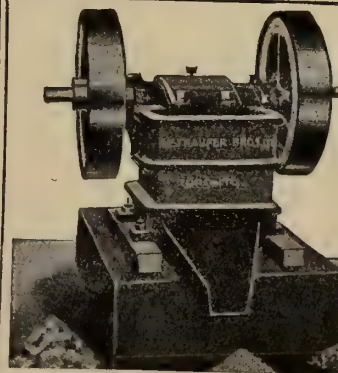
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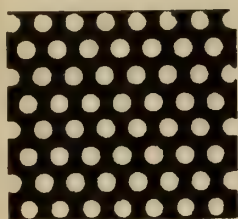
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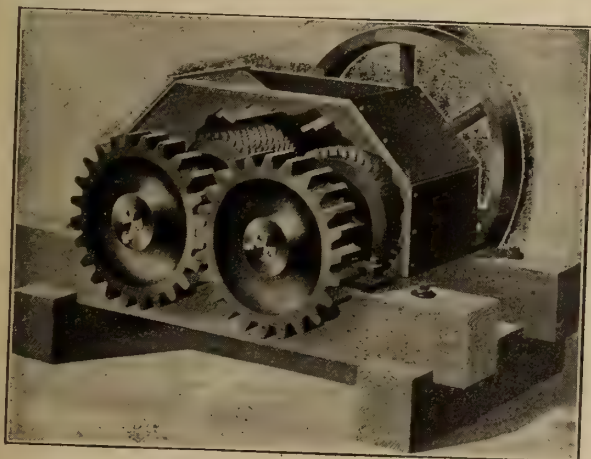
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WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

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MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

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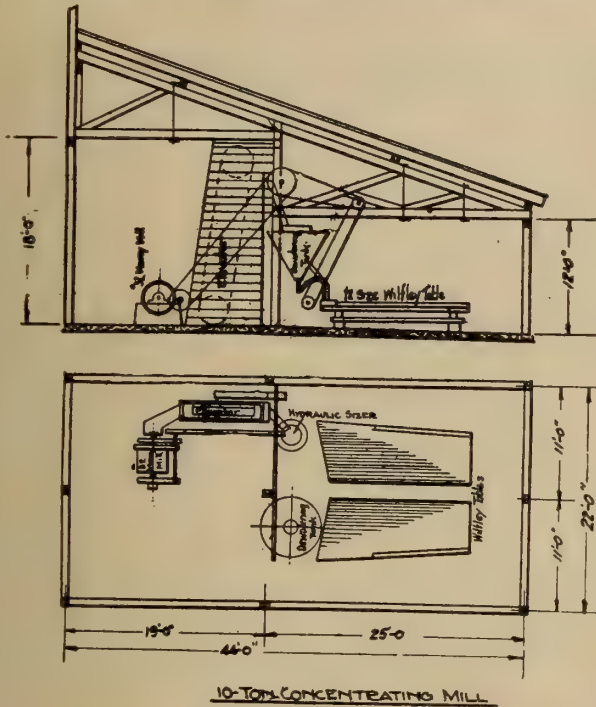
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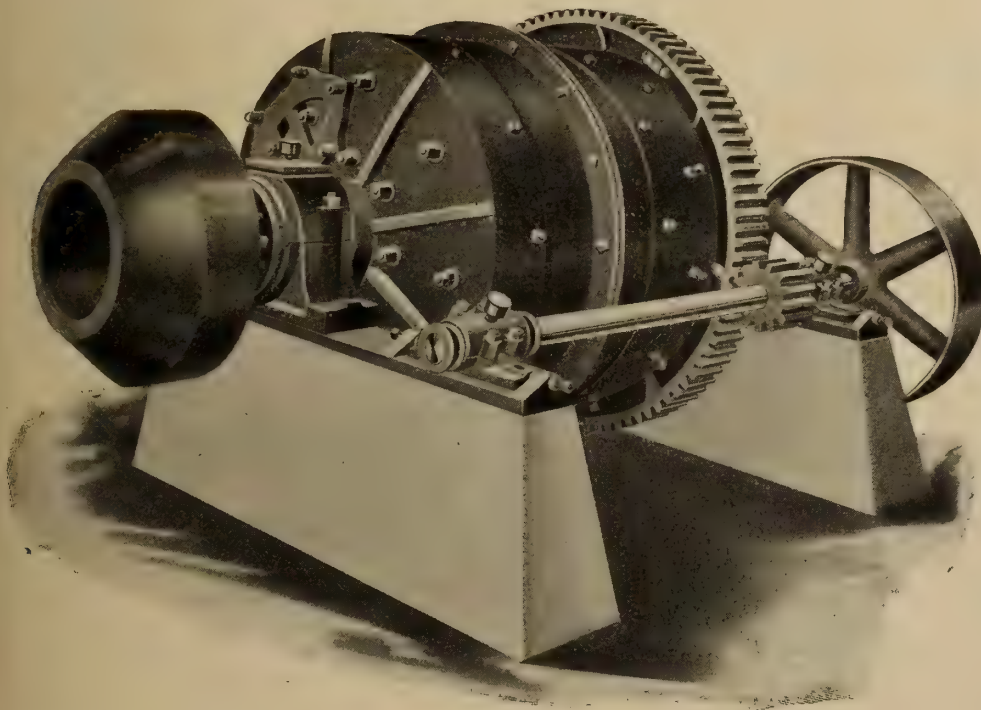
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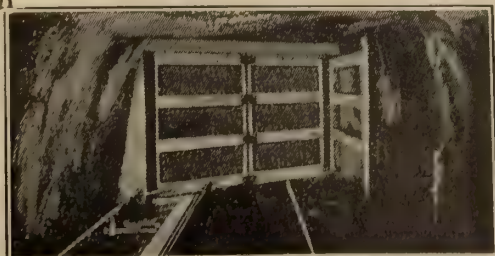
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THE ARBITRARY PRICE OF GOLD.

During recent months there has been much discussion concerning the difficulties being encountered by producers of gold and the advisability of encouraging production. These discussions have brought before the public the fact that increased costs threaten to make gold production unprofitable, and have raised the question whether gold production is essential.

A good deal of the discussion is more entertaining than instructive; but enough has been stated to make it clear that we cannot depend on the so-called economists to solve the problem. They are too much given to generalizing without stating the limits of the application of their arguments. If the gold producers want to get the facts correctly before the public they will have to get together and study the matter thoroughly as one that vitally affects their business.

As pointed out by Mr. B. L. Thane, in a recent letter published in "Mining and Scientific Press," production of gold is now being made at a loss by a large number of companies. This is, unfortunately, not a new experience in the history of mining, but it is one that is making an unusual amount of trouble because the conditions are peculiar. In the mining of other metals there are periods when over-production so breaks the price that operation of the lower grade or smaller properties becomes unprofitable; but such periods are attributable to lack of demand for the product. In the case of gold, there is no lack of demand, but a price fixed by Governments. Unfortunately, the price was fixed before the war and is out of keeping with the cost of production. Unfortunately also, the price cannot be changed so easily as that of other metals. Mr. Thane says:

"The production of gold from the majority of the low-grade deposits is now being made at a loss. Last month, 300,000 oz. of gold produced on the Rand, which is the most productive gold-mining region in the world, was sold to the Government at less than cost, and the same thing is true of several of the largest properties in Alaska, Canada, and the United States. It is inevitable that, unless some form of bonus is given to the producing mines, or an actual increase in the value of the product itself is made by the countries in which gold is now being mined, the large producers will be compelled to discontinue operating and the already decreasing production of gold will be most seriously affected. It is obvious, likewise, that the estimated profits on ore, based on pre-War conditions, on which these enterprises were established, have ceased to exist. Tonnages of developed ore in the mines that were carried as an asset because profit was indicated on the pre-war basis, must be entirely written off under pre-

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Development of the oil fields of southern Ontario is meeting with very encouraging results. There will be considerable production from new wells this year and we may reasonably expect that the success of those who have been pioneers in the new campaign, will attract many others. As pointed out by Mr. M. Y. Williams in this Journal last year, southern Ontario offers good opportunities to the driller.

A considerable amount of wildcat drilling must be done before we know what the oil resources of Ontario are. With the assistance of men who have had experience in oil production in Ontario and with advice from geologists who have studied the structural features of the oil fields and of the surrounding country, the driller in Ontario is not without good guides in choosing likely places. It should be recognized by the public, however, as it is recognized by oil men, that many of the wells drilled must necessarily be wildcats, if the territory is to be thoroughly tested. The exploration for oil in Ontario has now been undertaken on a scale and with preliminary successes that warrant one in believing that important new fields will be developed. It is to be hoped that the progress of development will not be seriously hampered by the efforts of those who are more interested in fooling the public than in searching for oil.

sent conditions, and only the richer ore in the operating mines can be carried now in the form of a reserve. In other words, no low-grade gold-mining operation conceived, financed, and developed under pre-war conditions can possibly work out as originally planned, nor can it hope to continue for any length of time unless a bonus is offered by the Government to compensate for the increased operating costs, or unless the value of the gold, as fixed by the Government, is materially increased.

"One of the most important and interesting questions arising in this discussion is the value of gold as now fixed and accepted by the leading nations of the world. The price of pure gold in our standard of money is fixed at \$20.67 per ounce. This value was arbitrarily fixed by the Bank of England when England decided that it was advisable to fix the value of gold in order to standardize exchange. Prior to this, while England had adopted gold as a standard, she had been in the habit of purchasing gold in the open market at a variable range of prices. This necessarily affected, from day to day, and from purchase to purchase, the very basis of exchange. Hence the necessity for establishing a fixed price.

"It is generally conceded that the price as fixed was taken from the last purchase of gold made by the Bank of England in the open market. This, in our money, as stated above, happens to have been \$20.67. Shortly after this, the other leading nations accepted that gold standard, and likewise the price that had been fixed arbitrarily by the Bank of England and sustained with the approval of the British government. The important fact regarding this, so far as the present discussion is concerned, is that the price as fixed was purely arbitrary. Even if measured in the currency of the time at which this occurred, when gold was estimated to be worth \$20.67 per ounce, it is evident that the great increase in the demand for this product and the increased cost in producing it, makes this valuation now incorrect and decidedly too low. Accepting gold as a basis of all credits, there has never been a period in the history of the world when the demand has been so great as now, in order to sustain a reasonable reserve against the Government issues of bonds, certificates, and other forms of obligation."

The "Annalist" says: "All the arguments for action in favor of the gold industry regard it as a burden instead of a convenience that there should be a fixed Mint price for gold. They fail to remark that they are under no compulsion to sell to the Mint, and that they do not sell to the Mint as selling usually is understood. Theoretically they receive their metal back again, in coins of certified weight. They often are paid in checks rather than in bullion, but that does not alter the fact that they get from the Mint all that they give to the Mint, less only an inconsiderable Mint charge. The Mint price has nothing to do with the worth of the gold. That is settled now, as it was originally settled

in England, by the universal market for all commodities. Gold is worth what it will buy, no more, no less. The worth of gold is fixed by the price of commodities as much as the worth of commodities is fixed by the price of gold. The goods buy the gold, and the gold buys the goods. The market is free even in these war times, and all buyers and sellers fix their own prices for whatever they own, whether goods or gold, subject only to the control which affects goods and gold alike, for reasons independent of the price or value of either goods or gold.

"It would make little difference whether the Mint price were doubled or halved. In either case the bargains would be for the weight of gold which passed, and which is certified to all buyers and sellers. The producers of gold get their profit when they spend it, not when they mint it. The alteration of the Mint price would be disturbing generally, without benefit to them. What they want really is an alteration in their favor of the relation of the prices of goods to gold. It is difficult enough to control individual prices. It is practically impossible to control the relation of one price to another. Gold and goods are exchanged around the globe in these days, and the attempt to control the value of gold in international exchange—something quite different from the control of the Mint price—requires control of world conditions."

With such plausible arguments economists convince themselves that gold is always selling for what it is worth. The public looks to them for information and generally they are able to obtain some; but many economists seem ever willing to believe that all things are as they should be. They repeat in various ways their much loved view, that the prices of commodities are directly determined by supply and demand, even though they know that the actions of certain groups of men may easily establish new prices at times when no serious change takes place in supply and demand, or cost of production. They say "if more gold is produced the price of commodities will be higher," when they mean "if more gold is produced and our theories are sound and prices change but do not decrease then prices must increase." There are many things affecting prices of commodities besides the available supply of gold. If the effect of all these things remained stationary over a long period we might find out the relation between gold production and prices; but it is folly to assume that they do and then make deductions simply to prove a theory. Gold is the standard by which we measure prices of commodities, but does it necessarily follow that prices are always what they should be?

While we do not advocate the changing of the price of gold we nevertheless believe that the selling price of gold is not in accordance with the demand and the cost of production. General recognition of this fact is desirable, as such recognition may result in changes that will tend to lower the cost of production.

Mining in Northern Manitoba

By J. A. Campbell, Commissioner of Northern Manitoba

"Northern Manitoba" is now beginning to have a really definite meaning to the people of Canada as a vast territory of immense possibilities, just in the initial stages of its development. What has already taken place in the way of development is merely a minute indication of what may be counted on in the future. This Northern hinterland having an area of 178,000 sq. miles was added to Manitoba in 1912, thus putting that province on an even footing, as to extent, with the other Western provinces, and only the future will show whether this equality holds good in other respects.

This extension of territory means much to Manitoba. Hitherto the most inland, it is now to be reckoned with as one of the Maritime provinces; and the province which has given its name to the best wheat in the world and which heretofore has been looked upon as devoted almost exclusively to the production of that wheat, must henceforth take an important place amongst the mineral producing areas in Canada, particularly in the output of copper and gold.

This country, which is looked upon and spoken of as "Hinterland" is really at the front of the province, for it was by way of Hudson Bay, through this region that the first settlers came to the Red River Valley in 1812. Before many more years have passed the wheat and farm products of the successors of these pioneers will pass out through the gateway by which they came. This means of export (and of import also) is the Hudson Bay Railway, extending from The Pas to Port Nelson and now almost completed.

Among other benefits, the construction of this road is directing the attention of the people to Northern Manitoba. It has become known that this immense area is not a vast stretch of rock, water and muskeg which has been the general opinion regarding it hitherto, but that there exists there natural resources of great richness and variety. While investigation as yet has been only of the most general nature, it has shown the existence of hundreds of thousands of acres of good agricultural land, great stretches of valuable pulp wood, a vast network of lakes and rivers abounding in fish of the finest quality, and an unknown area, hitherto merely scratched, in which there have been made discoveries of mineral wealth of such promise as to put Manitoba in a prominent position as a mineral producer.

Mineral Area.

Until very recently the known mineral area has been practically confined to that lake and river district stretching from Lake Athapapuskow and the Saskatchewan boundary on the west to Wekusko or Herb Lake on the east, a distance of approximately one hundred miles. This, roughly speaking, forms the base of an inverted triangle, the apex of which is The Pas, the westerly side being the Saskatchewan river, and connecting lakes, and the easterly side the Hudson Bay Railway.

Lake Athapapuskow is reached by Ross Navigation Company steamers, which give regular summer service from The Pas to Sturgeon Landing via the Saskatchewan river, Cumberland and Sturgeon Lakes. From Sturgeon Landing to Lake Athapapuskow, a distance of sixteen miles, a road has been constructed by the Manitoba Government which is of very material benefit for the hauling of machinery, supplies and other freight.

There is an alternative canoe route here, via Sturgeon and Goose rivers and Goose Lake, connecting with the terminus of the government road at Lake Athapapuskow, by a three mile portage.

The other end of the district at Herb Lake is still more easily reached. This is by the Hudson Bay railway from The Pas to Mile 82. From there a Government road, locally known as the "Gordon Highway" runs to McKay's Landing at the south end of the lake, a distance of eleven miles. Mining properties already discovered commence at a point about five miles north of this landing, and run to the northern end of the lake.

As might naturally be expected, mineral discoveries in this district were first made at each end of the mineral area, as being most readily accessible, and these also are the points where active development work and mining operations are now being carried on.

The Great Sulphide Property—Flin Flon Lake.

It is less than three years ago, August, 1915, since this great body of ore was located and thus was demonstrated the fact that copper must henceforth be taken into consideration as one of the important mineral resources of the North. Thomas Creighton was the original discoverer. He was one of a group of six prospectors sent out to prospect in that district by certain Toronto capitalists and mining men known as the Hammill-Currie-Fasken syndicate. Ten claims were staked and steps taken immediately to find out the quality and extent of the orebody. By stripping and trenching it was learned that it is approximately 2,000 ft. long. The body is narrowest at the north end and widest at the south end where it enters the lake, being there about 300 ft. wide, a vast deposit of solid sulphide. Sampling and re-sampling indicated that at normal values the ore would realize about \$10 to the ton in gold, copper and silver, the copper content averaging 1¼%.

This discovery attracted wide attention and during the succeeding two years prominent capitalists engaged in mining operations, and mining engineers from New York, Boston, San Francisco, as well as from eastern Canada, visited the property. Various propositions were submitted to the original owners, who held out for a figure and terms which were thought to be somewhat excessive and onerous for a new property. No sale outright has yet been made, although others have become interested in the property and it is now in the control of a syndicate which includes these along with most of the original owners. This syndicate is under the management of John H. Black, of Toronto, well known in connection with various Northern Ontario enterprises.

A few months after the discovery a contract was let for diamond drilling this property. A complete drilling outfit, supplies and equipment were taken in during the winter and camp established on the lake shore. On March 26th, 1916, two drills were started on the work and continued until July 15th, 1916. Further contracts were let subsequently and these drills have been almost constantly employed for a period of nearly two years. \$200,000 has been spent in this and other work of investigation in the same connection.

This big expenditure has been amply justified. Investigation has borne out the original estimate, and the

drilling done has resulted in proving up the stupendous quantity of over 20,000,000 tons of sulphide ore which will yield an average of from \$8 to \$10 per ton, at normal prices.

This proven tonnage has satisfied the owners that development work and actual mining operations should be proceeded with. To do this properly means the erection of a smelter at the mine or at some place convenient thereto, also the construction of a railway from The Pas, a distance of about eighty miles. Whatever it might be possible to do at the present time regarding the smelter, war conditions have now made it out of the question to construct the railway. Reports from reliable sources indicate that it is absolutely impossible to obtain the necessary steel.

To properly work and operate this property along the lines indicated means that an important camp of at least 2,500 people will be established there, and a tremendous impetus given to the northern mining industry generally. The construction and operation of the works required will also result in the development of other properties in the district, which the owners are not now able to handle properly owing to the great cost involved, but which properties can, when transportation facilities are afforded and a smelter located at an available point, be operated to advantage. Here is an immense enterprise, the development of which can be confidently looked forward to immediately on the conclusion of the war.

Mandy Mine—Schist Lake.

In all the history of mining there is probably on record no enterprise more unique than that carried on by the Mandy Mining Company at Schist Lake. The truth of this statement is readily conceded when it becomes known that this company after mining the ore, haul it about forty miles by teams, then ship it 125 miles by boat and barge to The Pas, and from there by rail to a smelter at Trail, B.C., half way across the continent. It is handled in the process six or seven times. Only marvellously rich ore and a large quantity of it could stand such expense.

In October, 1915, after the Flin Flon discovery had become known, Mr. F. C. Jackson, a sub-contractor on the Hudson Bay Railway and Mr. S. S. Reynolds, a prospector of some experience, started out from The Pas to see the North country and do some prospecting. By a lucky chance they discovered on the shore of Schist Lake at a spot where many others had been before, the deposit of copper sulphide, which has since proven to be so valuable. Mr. J. E. Spurr, Vice President of the Tonopah Mining Company, was in the district at the time, inspected the claims staked and was immediately impressed with their possibilities. Before he left, an agreement was entered into by which the Tonopah Mining Company took over the property and agreed to develop and operate it. A subsidiary company called the Mandy Mining Company was immediately formed for this purpose, and the following summer \$40,000 was spent in diamond drilling, trenching and other preliminary work. This revealed a body of over 100,000 tons in one lens. Careful assays of the ore showed it to be composed mainly of copper and zinc, the former averaging about 20% and in addition to this there was found to be gold and silver values of approximately \$5 a ton.

With the price of copper soaring skyward owing to the great demand brought about by the war, it was in order to put this mine in the producing class at the earliest possible moment. This decision was arrived at

in the latter part of December, 1916, and contract was let by Mr. H. C. Carlisle, Superintendent for the Company for the hauling of 3,000 tons or more to the head of navigation at Sturgeon Landing, almost forty miles distant. Commendable enterprise was shown by the contractor, C. B. Morgan, in starting and pushing forward the work and by the spring break-up 3,335 tons had been deposited at the Landing, with the exception of a small amount which had been teamed all the way to The Pas. The ore was simply taken out of an open cut, the only machinery used being a couple of steam drills, and a horse derrick. During the summer of 1917 this ore was shipped to the smelter and the returns, therefrom were 337 oz. gold, 60 oz. silver and 1,113,935 lbs. of copper, the total tonnage therefor, averaging 17% copper.

During the summer months complete new mining equipment which had been taken in during the preceding winter was installed in a large frame building. The main shaft was sunk to 200 ft. level, and two drifts started in the orebody. Drifting was continued throughout last winter, and it is now extended 534 feet. Also the company purchased, or built, and put in operation during the summer a 52 ft. tug on Lake Athapapuskow, and a small stern-wheel steamer on Schist Lake, together with a number of large barges. By this means a quantity of ore was transported part of the distance by water, thus lessening the winter team haul to a very considerable extent.

Last winter a contract was let to the same contractor for taking out a minimum of 7,500 tons, and when the season closed 8,600 tons were in the dump at Sturgeon Landing. This is now being hauled out as rapidly as possible by the Ross Navigation Company steamers and shipped to Trail. A spur track has been put in by the Canadian Northern Railway at The Pas, connecting the main line with the dock, in this way facilitating very materially the work of trans-shipment. Further effort is being made to reduce the labor and expense incident to this work, and to increase the annual output so it is expected that next winter a still greater tonnage will be got out.

As this mine is only a short distance from the Flin Flon property the erection of a smelter there would be of very material benefit, and would result in great increase of output and corresponding lessening of expense.

Lake Athapapuskow District.

Until within a quite recent period the only claim of Lake Athapapuskow to distinction was that it is not only the largest of the many lakes in the district, but with its numerous islands and rocky shores it is looked upon as an exceptionally beautiful body of water. The Chica claims, located up the Pine Root river a short distance are being thoroughly prospected and a diamond drill has been working there for several months. This and others in the neighborhood are giving promise of satisfactory results. On the north shore of the east arm discoveries have recently been made which indicate that there is there a vast body of sulphide ore, running from 2½ per cent. to 3 per cent. copper. From reports received, it is estimated that this property will rival the Flin Flon discovery in extent and quality. A number of other finds have been made in the district, mostly copper. Geological indications point to the fact that there are other mineral deposits of value in the vicinity and further discoveries will doubtless be made from time to time.

Herb Lake Gold Mining District—Rex Mine.

It was in the summer of 1914, at Wekusko, or Herb

Lake as it is now more generally known, that the first important mineral discovery of the north was made. The prospectors who had this distinction were Messrs. Hackett and Woosey and the Kiski and Wekusko were the first claims staked. The discovery was a vein of gold-bearing quartz showing considerable free gold. This find attracted wide attention and soon the whole shore of the lake north of the above claims and for some distance in was all staked.

Among the claims subsequently located were those of the Rex group, staked by Messrs. Campbell, Hassett and Moore. These have since become the best known in the district and now contain a producing mine. The preliminary work of stripping and trenching showed up a vein of such promise that a deal was consummated with Makeever Brothers, mine operators of New York and Boston, whereby they undertook to develop the property, put up a mill and carry on mining work generally. A shaft was the first thing commenced, and it was found that as the depth increased the vein widened. One shaft has been sunk 120 ft. and another to a lesser depth. Considerable drifting has also been done.

As soon as the road from the railway to the lake was completed last summer, a portable saw mill was taken in, set up and put in operation forthwith, to cut lumber for mine buildings. It was fortunate that logs for this purpose were available in the vicinity. A full equipment of mill machinery for reduction work had already been shipped.

Buildings were erected and machinery installed during the winter. The main building is 60 x 55 ft. and shaft house 40 x 20 x 35 ft. Assay office was also put up. The camp buildings which are well built log structures were erected when the work on the claim was first commenced.

Machinery and equipment included a 10 ft. Lane mill with capacity of forty tons per day, together with amalgamation plates and Deister Overstrom concentrating tables. The engine is 55 H.P. and there are two 60 H.P. return tubular boilers and a 390 cubic feet air compressor with modern equipment of air drills. Forty men are now required in connection with operation of the mine and milling plant.

May 1st, 1918, was an eventful day in the history of Northern mining, for it was on that date that the Rex mill started crushing ore and with small interruptions for adjustments and cleaning, has operated continuously since. The first clean-up from 433 tons of ore crushed resulted in a sponge containing 365 oz. gold, 82% fine, having a value of \$6,186.53. Similar results were obtained from the next run of ore. These results are decidedly gratifying. To start up a small mill, and pay its way from the first month at a time when well known mines are shutting down on account of abnormal labor and commodity prices, is quite a feat and should definitely place Herb Lake on the map as a gold camp.

A few months ago when the owners had thoroughly satisfied themselves that they had a producing mine, a company known as the Herb Lake Gold Mines, Limited, was formed. Stock in this company is held mainly by Makeever Brothers, and the original owners of the claims. A few others have secured an interest but no stock has been put on the market in Manitoba.

The Moosehorn.

To the Northern Manitoba Mining and Development Company is due the credit for being the first to make an ore shipment from Herb Lake as a commercial pro-

position. The company is composed of local shareholders, and own the Moosehorn and other claims. Commandable energy was shown in development of the property. An 80 ft. shaft has been sunk and some remarkable returns received from assays. A 50 H.P. boiler, air compressor, drills, hoists, etc., together with regular camp equipment are on the property.

The trial shipment was sent to Trail smelter. This consisted of 57,000 lb. of gold bearing quartz, taken from the shaft in the ordinary way. The returns for the whole car were \$2,323.60 in gold, or \$81.53 per ton. Local capital, however, has not been found sufficient to work this mining property satisfactorily, so an interest therein has been disposed of to Makeever Brothers, who have undertaken to proceed with development work, and mining operations on the proper scale. As this mine is near the Rex the two properties can be worked together advantageously and with best results.

Other Properties.

The Elizabeth-Dauphin claims are another well-known group. Considerable work has been done thereon, including the sinking of a 50 ft. shaft. The Pas Consolidated Mines, Limited, control the property and have undertaken to spend a large amount of money in development work during the current year.

Shafts from 30 to 50 ft in depth have been sunk on several other claims, particularly the Syndicate, Kiski-Wekusko and McCafferty. War conditions have, however, prevented the programmes of the owners of these from being carried out, but they will be gone on with at a later date as the properties give good promise of satisfactory results.

Recent Discoveries.

A recent discovery which is attracting general attention is that made by Paul Gasse and his associates at the northern end of Herb Lake. The discovery was made in the granite which has hitherto been taboo to local prospectors. It has every appearance of being a pegmatite dyke in which there is considerable development of quartz in stringers and irregular masses.

The width of this mineral body is from ten to fifty feet; the length is not yet determined, but appears to be quite extensive. A number of samples have been assayed, and the results are very promising. The discoverers are now doing the usual preliminary work on the property in order to get a general idea of the extent and character. Several mining engineers from United States and Eastern Canada have recently visited it and one of them representing a big Canadian mining company has obtained a sampling option.

Now comes word of a find which opens up a new field. This is at Knee Lake, near Oxford House, on the Hayes River. Several prospectors working for an English syndicate have recently come out from there and recorded a number of claims. The discovery is gold quartz of low grade; but there is every indication from surface examination of there being a very large body of this ore, and that it is of uniform quality.

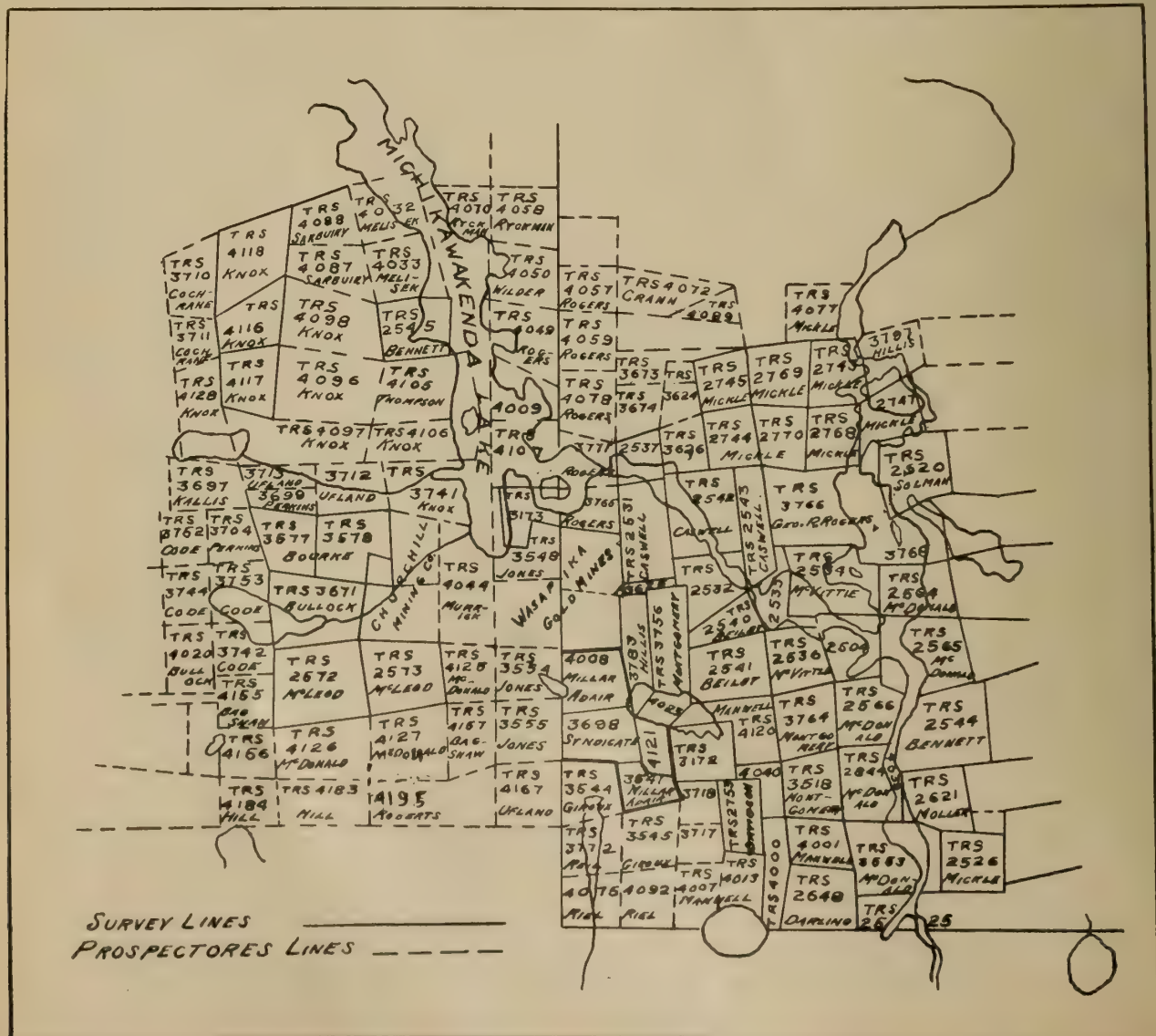
War conditions bear especially heavy on prospecting and mining operations, particularly in a new country. The kind of men engaged in these enterprises are those who are most useful in war work. The same can be said of many of the materials used directly or indirectly in mining development. Owing therefore to dearth of men and material, operations have been very much restricted; but sufficient has been done to show conclusively the existence of valuable mineral deposits which only await the recurrence of normal conditions to bring into being several good camps.

Gold Deposits in MacMurphy and Churchill Tps.

During the past two years a considerable amount of prospecting has been done with encouraging results on some gold properties in the vicinity of Michikawakenda and Wasapika lakes, in the eastern part of Churchill and the western part of MacMurphy townships. Gold was found in this area in 1911 and a large number of claims were staked in that year in Churchill, MacMurphy, Asquith and Fawcett townships. Many of the claims first staked are in the vicinity of Wasaquagama or West Shiningtree lake.

The properties referred to in this article are situated a few miles northeast of West Shiningtree lake and are thus about 70 miles north of Sudbury and 60 miles south of Porcupine. They are easily reached by water routes from the Canadian Northern Railway. Small motor boats which can be carried over the short portages make the trip from Kashbaw or Ruel in about ten hours. The water route is about 45 miles. A winter road has been cut and for part of the distance a summer road is available. Navigation has been made easy by the use of dams and by clearing obstructions from the streams and portages, but considerable work must be done on the roads before they will be satisfactory.

While numerous promising discoveries were made in 1911, comparatively little development work has yet been done in the area and most of what has been done has been disappointing. Gold is very abundant in the area and many small rich deposits have been found. It was obvious from the time the first discoveries were reported that the area merited careful investigation, and it is unfortunate that the results of examination of some of the early discoveries failed to justify the claims of the owners. With very little work done on the properties prices were placed on them that would only have been justified if the deposits had been bonanzas. Operators who might have been persuaded to take a chance, did not find the results of examination such as to warrant large prices being paid for the properties and few who came to investigate stayed to develop. Most of the prospectors themselves did little development work and as a consequence the area remained unproven. It is known that gold is plentiful in the area and it will be surprising if no profitable gold mine is developed, but the area has been for several reasons unpopular. The transportation problem is a serious one. Most of those who have carefully examined and



sampled properties in the area have reported unfavorably. Rich ore occurs on several properties but, so far as is known, only in small quantity and scarcely to be considered in judging the possibility of mining the deposits profitably. Some bodies of fairly good ore have been indicated by surface sampling; but so many seem too small or too low grade that there is a natural tendency to fear that expenditure of money on development work under present transportation conditions would be unjustified. When one mine is in operation and producing gold there will probably be more work done on the neighboring properties, but nobody wants to be the pioneer.

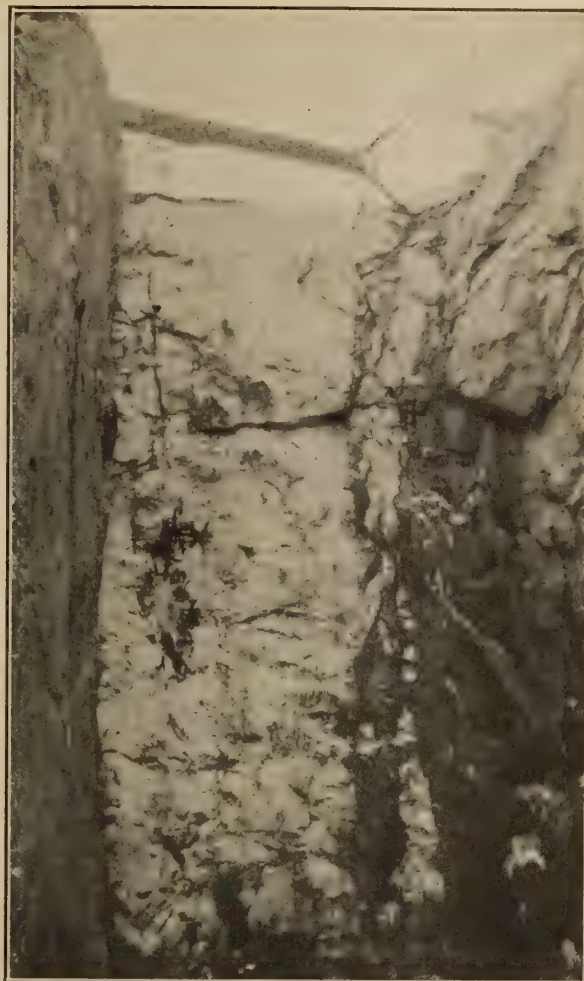
The Ontario Bureau of Mines in 1912 published a report on the West Shiningtree area by Mr. R. B. Stewart. In the following year the Bureau published further notes and a geological sketch map prepared by Mr. Stewart. The Geological Survey, Ottawa, has also published information concerning the geology of the area (Memoir 95) which is included in a large area mapped by Mr. W. H. Collins. In view of the numerous gold discoveries it is to be hoped that this preliminary geological work will soon be followed by a more detailed map and report on the area. The geology of the vicinity of the gold deposits examined by the writer needs careful study if the area is to be prospected intelligently. The wall rocks are of many kinds, including several varieties of greenstones and felsites, ferrodolomite, conglomerate, greywacke, and porphyries. Diabase dykes are common. The gold deposits vary considerably in character as well as in size and their composition and structure as well as their gold content need study. The rock relationships have yet to be worked out in sufficient detail and their structure is probably not understood by the prospectors. The relationship of the deposits to minor and major fractures and to the smaller intrusive masses of rock are of first importance and a detailed geological map would help one to determine them.

W. H. Collins' Report on Geology.

While detailed maps are lacking, a very good idea of the general geology of the area can be obtained from the reports of Mr. Stewart and Mr. Collins. Mr. Collins' report is the more recent and is accompanied by geologically colored maps; Map 179A of the Onaping area, published in 1917; and Map 153A of Asquith and Churchill townships, published in 1916. Mr. Collins says in part:

"Three main geological divisions are represented: the pre-Huronian schist-complex, the batholithic granite-gneisses intrusive in these schists, and dykes and remnants of sills of quartz diabase similar in character, and presumably in age, to the post-Cobalt diabases found throughout Onaping map-area. The gold-bearing veins are found only in the schist-complex, which is, therefore, of chief interest. The schist-complex consists of an extraordinary variety of igneous, mainly volcanic, rocks. The lavas range from basalt to rhyolite and with these are associated volcanic tuffs and one sedimentary series derived from pyroclastic materials.

"The older part of the complex, which was not differentiated into its component formations, includes diabases, amphibolite, quartz porphyry, etc. The oldest rocks differentiated from it consist of flows and tuffs of hornblende andesite and trachyte not separable one from the other. These tuffs grade upward into a well stratified series several hundred feet thick, consisting, in ascending order, of conglomerate, an arkose-like



Gold Quartz vein on McVittie property (the Saville vein).

member, and finely bedded greywacke which locally becomes a lean iron formation. This series is composed of the same materials as the underlying tuffs and appears to be only a water-assorted phase of them. The sediments are cut by dykes of a pale-grey rock of intermediate composition, characterized by its bright red color when decomposed. A large flow of ellipsoidal andesite around West Shiningtree lake appears to be younger than the red-weathering rock and still younger are small bodies of nearly white rhyolite. All these rocks are traversed by wide dyke-like bodies of a coarse porphyritic granodiorite which may represent apophyses from the granite-gneiss batholith. These rocks have been greatly disturbed; nevertheless schistification has been confined mainly to the tuffs and sediments and to local zones in the non-clastic formations. Most of the intrusives and flows are remarkably well



Gold Quartz on Foisey claim.

preserved and massive. Besides the metamorphism due to deformation, all the schist-complex in a zone about half a mile wide next to the granite-gneiss batholith has been contact metamorphosed chiefly to chloritic schist and amphibolite.

"The overburden of sand and gravel is, fortunately for prospecting, not thick nor continuous. Rock outcrops are abundant and none of the exploration trenches seen were more than 10 feet deep. Recent forest fires have also overrun a large part of the district, facilitating its exploration.

be a purely fortuitous circumstance. The genesis of the West Shiningtree veins remains, therefore, an open question.

"There are two somewhat different types of deposit. In most cases the gold is found in distinct veins from a few inches to 6 feet wide, the widths varying greatly from place to place. Some have apparent widths at the surface of 20 feet or even more, but this is due, in a number of cases at least, to the veins being folded, so that the surface exposed is oblique instead of a normal cross-section of the vein. Ordinarily they are nearly



Scenes on the water route from Kashbaw to Michikawakenda lake.

Ore Deposits

"The gold-bearing quartz veins intersect all the rocks of the schist-complex with the possible exception of the granodiorite dykes. Their relation to these dykes has not been observed. They are cut, however, by dykes of the post-Cobalt diabase. It has not been possible to fix the age of the vein formation within narrower limits. The veins have been found in greatest abundance in the ellipsoidal andesite. It is also noteworthy that the interspaces between the ellipsoids are filled with quartz, calcite, and epidote, a sample of which, collected by the writer and assayed by Mr. H. Leverin of the Mines Branch, was found to carry a small amount of gold. The abundance of veins in the ellipsoidal andesite and the presence of gold in the interellipsoidal filling suggest some relationship with the andesite flow. It is not to be overlooked, however, that the interellipsoidal spaces may have been filled by agencies quite unconnected with the andesite flow, and that the abundance of veins in that formation may

vertical. A number of veins had been traced for a distance of 200 feet when the district was last visited by the writer, so it is probable that they attain considerably greater lengths. They are filled with white quartz. Occasionally the quartz is accompanied by patches of white carbonate, which weathers to a rusty, limonitic powder. Minute aggregates of tourmaline were found locally in the quartz. Pyrite in scattered grains occurs both in the vein matter and in the wall rock. Gold occurs as small flakes and irregular particles in the quartz and also in small cavities in the quartz which are filled with limonitic powder, probably the weathering product of pyrite.

"In fewer cases mineralization has occurred in a shear zone in the schist-complex. The schist is filled with small veins and stringers of quartz and both schist and quartz are sprinkled with pyrite. These mineralized shear zones have no definite boundaries separating them from the less sheared, unmineralized country

rock. They are larger than the quartz veins but their gold content is too low for profitable mining."

At the south end of Michikawakenda lake are two promising gold deposits which have been discovered and stripped since Mr. Collins examined this area. The larger of these, the Ribble vein, on the property of the Wasapika Gold Mines, is in altered igneous rocks—mostly a grey volcanic rock that is altered in places to

deposit and its gold content. It will be noted that the structure is by no means simple and that the deposit is a difficult one to sample. The large number of samples taken indicates a good average value and a considerable quantity of ore; but development work is necessary to determine more definitely the shape and size of the ore body. The information at present available is encouraging enough to warrant considerable expendi-



Camp buildings, Wasapika Gold Mines.



Wasapika mine, from the north.



Wasapika deposit. The vein lies on face of this outcrop.



Wasapika mine, from the south.

a ferrodolomite. The other deposit, the Kingsley, on the Knox claims, is enclosed partly by conglomerate and greywacke and partly by grey but red-weathering fine-grained, porphyritic, igneous rock which may conveniently be called a porphyry. Those familiar with gold deposits in Northern Ontario will find the altered wall rock from the shaft at the Wasapika mine to be quite similar to the grey ferrodolomite at the Hollinger mine at Porcupine, while the wall rocks at the Knox property are somewhat similar to those at the Tough-Oakes mine, Kirkland Lake. We would not like to have our readers infer that the value of the properties is necessarily great because of these similarities; but there are some advantages in finding yourself among old friends. We would consider that so far as their composition effects them the wall rocks are kindly disposed. They have been much altered and saturated with carbonates and then the fissures have been filled with auriferous quartz.

The Ribble Vein.

One of the most promising deposits in the area is the Ribble vein on the property of Wasapika Gold Mines, Ltd., held under lease from the Province of Ontario. Mr. George R. Rogers, president and manager of the Wasapika Company, has carefully stripped and sampled this deposit and has begun the sinking of a shaft to develop it at depth. The accompanying photographs and copy of the assay plan will give some idea of this

ture on development work. The irregularity of the deposit as exhibited in the surface outcrops suggests that considerable skill will be necessary in order to avoid mining too much waste with the ore. On the other hand, the persistency of the auriferous quartz outcroppings along the strike on both this and adjoining properties indicates great possibilities in the event that it is proven possible to mine a part of the deposit profitably. The obliquely truncated folds exposed on the side of the hill give an exaggerated idea of the size of individual quartz bodies; but the deposit is nevertheless of considerable size. The shaft has been located in a position which should prove advantageous in exploring the deposit at depth.

In his report on the property, Mr. Rogers states that the vein, as uncovered on the Wasapika properties for 1,800 feet, averages 5 ft. 1 in. So far the vein has only been sampled for a distance of 500 ft. Concerning the results of this sampling Mr. Rogers says: "I have divided this work into two sections:

"**No. 1 Section**—Starting at a point 229 feet north of the south boundary line of claim No. T.R.S. 2530, eighteen carefully moiled samples were taken at intervals across the full width of the vein for a length of 150 feet, which gave an average stoping width of 50 inches and the assay results gave an average value of \$10.40 per ton in gold. **No. 2 Section**—Starting at a point 120 feet north of sample No. 32 and continuing

north along the vein for a distance of 280 feet, over which distance 58 carefully moiled samples were taken across the full width of the vein, which show an average stopping width of 49 inches and an average assay value of \$8.00. A sketch plan of the vein and assay chart attached to this report.

"The main shaft, which is being sunk 80 feet west of the vein, has reached a depth of 50 feet. Samples taken across the bottom of the shaft gave an average of \$11.20 per ton over a width of seven feet. . . . For a distance of 500 feet the schist forming the hanging wall of the vein has been eroded away for an average depth of 20 feet. The average width of the vein over this distance is 5 feet. Estimating the weight of this ore at 13 cubic feet to one ton will give approximately 3,846 tons of ore in sight, with an average assay value of \$9.00 per ton, and practically ready for the mill."

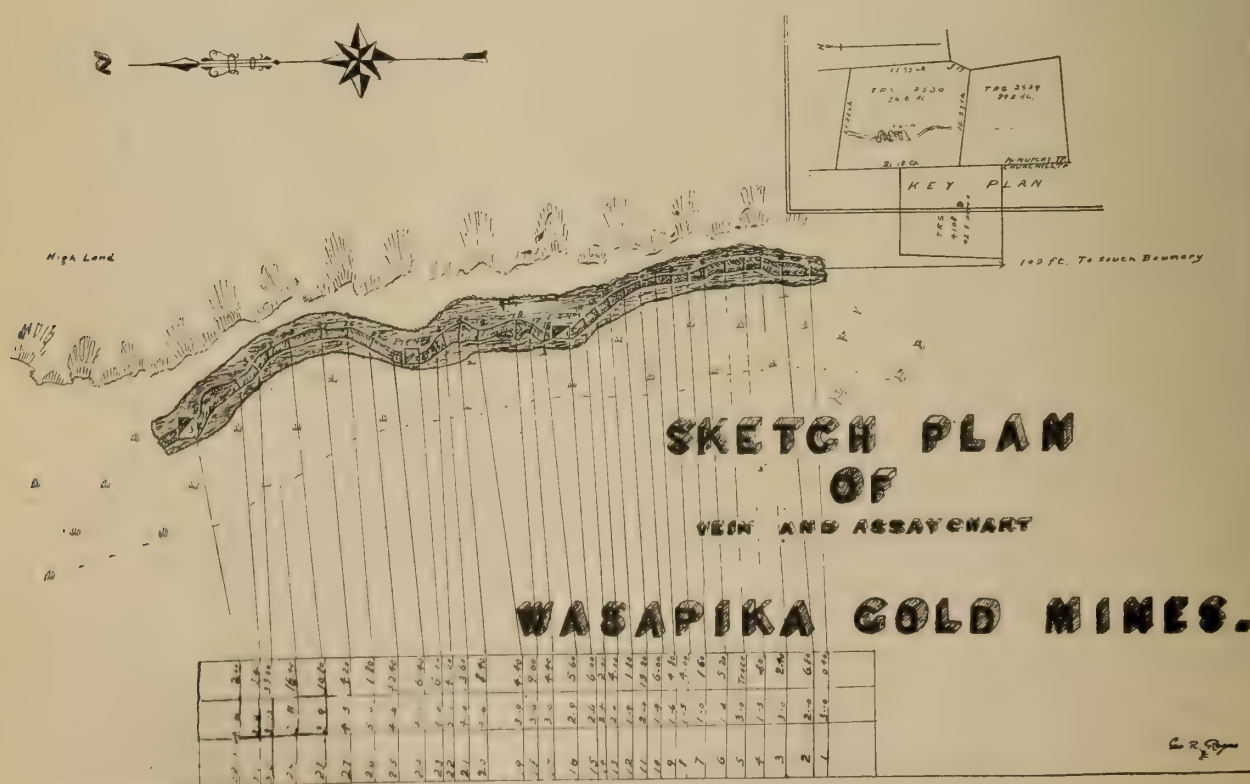
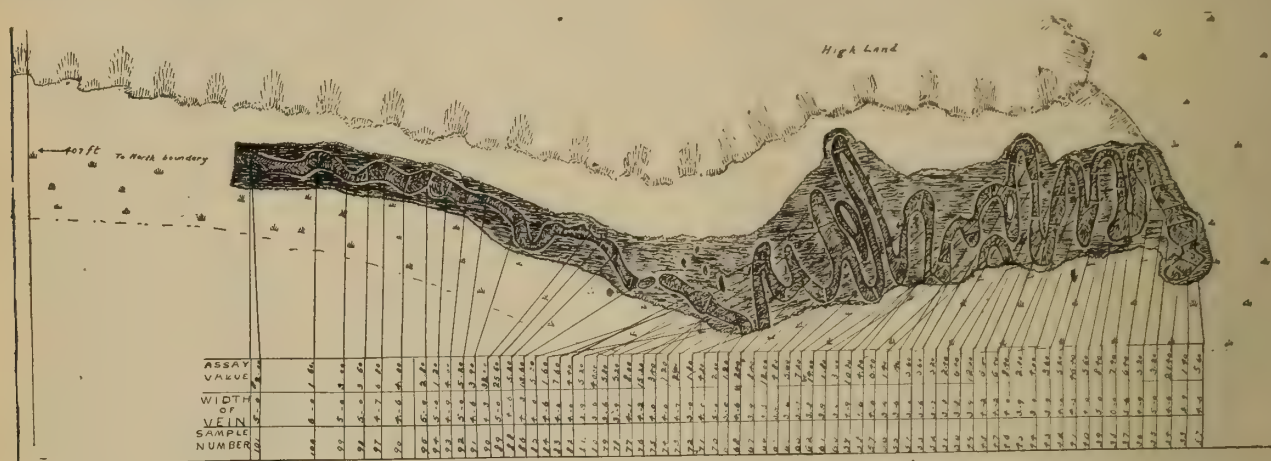
Mr. Rogers notes that where the vein is in contact with diabase dykes, which cross the vein diagonally, high assays are obtained.

The Kingsley Vein.

As shown on the accompanying map the Knox claims lie to the west of the south end of Michikawakenda lake, a short distance north-west of the Wasapika property. On one of these claims is the Kingsley vein, a persistent, narrow, comparatively regular, quartz vein enclosed partly in sedimentary rocks—greywacke and conglomerate—and partly in igneous rocks—a grey and red fine grained porphyritic rock. A shaft has been started on a part of the vein that sampling has indicated to be very good ore. The results so far have been very encouraging, and further development here may reasonably be expected to show a quantity of ore that will make operations profitable.

Other Properties.

At the south end of Lake Wasapika are the Atlas and McVittie properties, known to many as the Jefferson and Saville claims. On the Atlas are two types of gold deposit. That appearing on the hill top which com-



Plan and assay chart of Ribble vein—by Geo. R. Rogers.

mands Wasapika lake is a white quartz vein enclosed in massive greenstones. The accompanying photograph shows this vein and stringers from it. Another deposit, from which some very rich ore was taken is a narrow very pyritic band in rusty grey schist. The rich ore is said to have been taken from quartz nests found in pits sunk in this pyritic band. The quartz, which shows in the pits along the deposit is very dark and rusty and is not nearly so conspicuous as the weathered pyritic rock.

To the west of the Atlas is the McVittie property. An open cut has exposed an imposing vertical face of quartz on the Saville vein. The accompanying photograph shows this exposure.



Gold Quartz vein on Atlas property (the Jefferson claim).

On the shore of the narrow south-east arm of Michikawakenda lake are the workings on the Caswell property, now known as the Gold Banner. Rich samples of ore from this property attracted considerable attention a few years ago and considerable development work has been done. We were, however, not allowed to look at the vein when we visited the property. The accompanying photograph shows the workings on the north shore as they appear from the lake.

South of the Wasapika property on the Miller-Adair and Foisey claims quartz veins have been uncovered at the edge of outcrops which appear on the eastern edge of the low-lying land which runs south from Michikawakenda lake. These veins run along the edge of the rock outcrops in about the same direction as the Ribble vein. Gold can be seen in the quartz on the Foisey claim. No work has recently been done at either of these properties.



A view of Caswell property from the lake.

WILL SAMPLE PEAT BOGS.

Cobalt, Aug. 11.—With the intention of prospecting in the bogs of New Ontario, giving special attention to those in the vicinity of Cochrane, A. Anrep, a Dominion Government specialist on peat, arrived in town yesterday en route to the north. While here Mr. Anrep conferred with A. A. Cole, a member of the peat commission regarding the prosecution of the work. He expects to be in this district for two or three weeks and intended taking a number of men north with him to carry out his scheme of operations. There is no possibility of any official action being taken this year to utilize the peat for fuel, but sampling will be carried out until the winter frosts put a stop to outdoor work, after which testing will be done.

A NEW DIAMOND DRILLING COMPANY.

The Sudbury Diamond Drilling Company, Ltd., has been organized under a Dominion charter, with head office at Sudbury, Ontario. The leading spirit in the organization is Mr. S. J. Fitzgerald, with whom are associated several others, principally local men who are prominent in the mining and commercial life of the section. Mr. Fitzgerald, who is President and General Manager, is a man of wide experience in diamond drilling, having successfully carried on operations not only in Ontario, but also in the United States and Western Canada as well. For the past several years he has been connected with the drilling companies operating in Ontario, and is thoroughly familiar with a great variety of rock formations.

MINERALS SEPARATION.

The Minerals Separation Co. has filed with the Supreme Court petition for a writ of certiorari in the Butte & Superior litigation. If granted, Federal Court decrees in Montana will be reviewed by the highest court in the United States.

The petition states that two errors in the interpretation of the Supreme Court decision in the Hyde case are involved. These are: (1) Imputed limitation of patent to the use of half of 1% of oil or oily substance. (2) Imputed extension of patent to any oil or oily substance having preferential affinity for metalliferous matter over gangue whether capable of effectuating the process or not.

PROFESSOR LEDOUX DIED IN BATH TUB.

Sudbury, Aug. 8.—Particulars obtained to-day regarding the death of Professor Gaston Auguste Ledoux, the Belgian soldier-mineralogist, show that he lost his life in his bath tub. When the body was found the head was submerged, and it is thought that the Professor was stricken with heart failure during his cold plunge. He lost his home in Belgium when the Germans devastated the country, and afterwards he was grievously wounded fighting them. The body will be sent to Toronto, where Madame Ledoux resides.

NIPISSING.

In his regular monthly report to the President and directors, Mr. H. Park, manager, says that during July the company mined ore of an estimated value of \$333,947 and shipped bullion and residue of an estimated net value of \$877,231.

Underground operations continued to be of the usual nature and extent. Several new small veins of low assay were encountered at 73 shaft.

ALIEN PROPERTY CUSTODIAN TAKES OVER THE CONTROL OF TWO LARGE GERMAN-OWNED METAL CORPORATIONS.

Washington, July 24.—The Alien Property Custodian authorizes the following:

A. Mitchell Palmer, Alien Property Custodian, announced Monday that he had taken over the business of L. Vogelstein & Co. (Inc.), 42 Broadway, New York, and of Beer, Sondheimer & Co. (Inc.), 61 Broadway, New York, both of which were large German-owned metal concerns. In taking over these, and other metal businesses, the Alien Property Custodian has smashed for all time the German control of the metal industry in this country. The assets of L. Vogelstein & Co. are upward of \$9,000,000, and those of Beer, Sondheimer & Co. (Inc.) are upward of \$5,000,000.

Result of Investigation.

The two companies were taken over by Mr. Palmer as the result of investigations conducted by Francis P. Garvan, director of the Bureau of Investigation of the Alien Property Custodian's office. Further investigation into the metal situation is being made by him.

Beer, Sondheimer & Co. (Inc.) and L. Vogelstein & Co. (Inc.) were closely affiliated with the German Metal Gessellschaft, which for some years has dominated the entire metal market of the world. They dominated the metal market of this country in such a manner that they were enabled to sell copper, aluminum, zinc and other metals in Germany at a price much lower than the American consumer had to pay.

The enemy interest in Stallforth & Co., of New York, dealers in silver bullion, with a capitalization of \$1,000,000, has also been taken over by the Alien Property Custodian. This concern was another link in the chain of the German control of the metal markets of this country. F. Stallforth, the principal stockholder in this company, is now interned at Fort Oglethorpe, Ga.

Some of the Company Holdings.

With the American Metals Co., the large enemy interest in which has already been taken over by the Alien Property Custodian, Beer, Sondheimer & Co. and L. Vogelstein & Co. controlled most of the principal metal and smelting companies of this country, either by complete ownership of stock or by the ownership of enough stock to give them substantial representation on boards of directors.

Beer, Sondheimer & Co. own a one-half interest in the National Zinc Co., the entire stock of the Cuban Copper Co., the Cuba Copper Leasing Co., and the Norfolk Smelting Co., and 30,000 shares of the Minerals Separation American Syndicate (Ltd.).

Vogelstein & Co. have large holdings in the United States Metal Refining Co. and the American Zinc, Lead and Smelting Co. This latter concern controls the Wisconsin Zinc Co., American Zinc Co. of Tennessee, the American Zinc Ore Separating Co., the American Pipe Line Co., and the Oblesby Gas Co. Of the 70,000 shares of capital stock of the American Metals Co., 15,180 shares are owned by the Metallbank and M. C. of Frankfurt A/M, and 18,180 shares by the Metallgesellschaft of the same place.

The American Metals Co. completely owns the following companies: American Zinc & Chemical Co., Langeloth Coal Co., Langeloth Mercantile Co., Langeloth Townsite Co., American Metal Transport Co., Bartlesville Zinc Co., and South American Metal Co.

It had large holdings of stock in the following companies: Ohio & Colorado Smelting & Refining Co.;

Compania Minera de Penoles, South America; Compania de Minerales y Metales, South America; Compania Metalurgica de Torreon, South America; Compania Minera Paloma y Cabrillas, South America; Compania de Combustibles Agujita, South America; Fundicion de Guayacan, South America; Balback Smelting & Refining Co.; and Nichols Copper Co.

Firm's Part in the War.

From the evidence which Mr. Garvan unearthed it is apparent that L. Vogelstein and Beer, Sondheimer & Co. played an important part in Germany's declaration of war, and of the continuation of the war after Germany had gotten into it. Through their domination of the metal industry in this country these concerns were enabled to send vast supplies of copper and other necessary metals to Germany.

The activities of these German concerns in supplying necessary metals to Germany seems to have continued even after the beginning of the war in August, 1914, and only came to an end when the United States joined in the European struggle.

In 1914 the profits of Beer, Sondheimer & Co., were \$116,624; in 1915 the profits of this concern jumped to \$1,013,676; and in 1916 they reached the large total of \$2,000,000. In 1917, after the United States got into the war, the profits of this company dropped to \$196,900.

The profits of L. Vogelstein & Co. since April, 1916, were extremely large, the firm's business for the last three years approximating \$70,000,000. Between April and December of 1916 the profits of Vogelstein & Co. amounted to upward of \$2,500,000.

New Directors Appointed.

To make these concerns 100 per cent. American the Alien Property Custodian has appointed as directors Americans who are well known in the business and financial life of the country.

The directors named for Vogelstein & Co. are Edward M. McIlvain, former president of the Bethlehem Steel Co.; Louis A. Watres, president of the Scranton Trust Co. and former lieutenant governor of Pennsylvania; James N. Wallace, president of the Central Trust Co. of New York; Alfred H. Smith, president of the New York board of aldermen; C. C. Daniels, of New York City.

The Alien Property Custodian will allow Paul L. Vogelstein and Ernest Hethern to act as directors also. Isidor J. Kresel, 37 Wall Street, New York City, will act as counsel for this company.

Messrs. Wallace, McIlvain, and Watres will also act as directors of Beer, Sondheimer & Co., in addition to John P. Greer, 15 Broad Street, New York City, and Ford Huntington, 15 Dey Street, New York City. Benno Elkan and Otto Frohnknecht will act with the above directors.

Joseph F. Davies, former chairman of the Federal Trade Commission, and Isidor J. Kresel will act as counsel for this company.

Represent Enemy Interests.

The directors whom the Alien Property Custodian has selected to represent the enemy interest in the American Metals Co. are Henry Morgenthau, former ambassador to Turkey; Andrew W. Mellon, of Pittsburgh; George McAneny, assistant publisher of the New York Times; Lewis L. Clarke, of the American Exchange National Bank of New York; E. C. Converse, of the Bankers Trust Co. of New York. John J. Fitzgerald will act as counsel.

Mr. Wallace, with Francis P. Garvan, has been chosen by the Alien Property Custodian to act as directors for Stallforth & Co.

L. Vogelstein & Co. and Beer, Sondheimer & Co. filed reports with the Alien Property Custodian as required by the trading-with-the-enemy act, in which they claimed that they were American-owned New York corporations. Mr. Palmer referred these reports to his bureau of investigation, and after several months of investigation Mr. Garvan, the director of this bureau, found that an endeavor had been made to cover up the German ownership of the assets and that, in spite of the process of Americanizing them, undertaken after the outbreak of the war, their ownership was thinly disguised. **Establishment in New York.**

Prior to the war, Beer, Sondheimer & Co., of Frankfurt am Main, German dealers in metals, especially copper, established an American branch in New York (about 1904), which was managed by Benno Elkan and Otto Frohnknecht. They had written agreements with the home office whereby each was to receive a salary varying in amount, and each was to participate in the profits of the American business.

The American branch had control of the firm's business in the United States, Canada, Mexico, South America, and Central America. In 1912 Elkan and Frohnknecht made an agreement with the home office in Germany whereby each would receive a salary of \$900 per month and in addition 12½ per cent. of the net profits of the American branch, the German firm guaranteeing to each that the salary and participation in the profits should equal not less than \$18,700 per year. The German office provided all of the capital that was required in the business. At the time these agreements were made Elkan and Frohnknecht were German citizens. Although they had been in this country for a number of years, they never took out naturalization papers until early in 1917.

In August, 1915, the New York corporation was organized with the corporate name of Beer, Sondheimer & Co. (Inc.). The reason for the organization of this new corporation is perhaps best stated by Elkan and Frohnknecht in their report to the Alien Property Custodian, in which they say:

"On the outbreak of the European war it became increasingly difficult, and finally impossible, to communicate with the same partnership (the German partnership), and it has therefore been impossible to have a final statement of their accounts, as such managers of said American branch, with said partnership. In August, 1915, the New York corporation was organized with the corporate name of Beer, Sondheimer & Co. (Inc.), under the direction of Sullivan and Cromwell, as counsel."

Wireless Message Quoted.

That the home office was familiar with the plans for the organization of the American company, and that the latter was organized upon the advice of the German concerns is shown by the following wireless dispatch, dated August 28, 1915:

"Beer, Sondheimer Co.,

"Frankfort, Main:

"Have completed the corporation as planned under name Beer, Sondheimer & Co.; incorporated capital, \$1,000,000. "Elkan Frohnknecht."

The capital stock of the new American corporation consisted of 10,000 shares of the par value of \$1,000,000 and were all issued to the German copartnership, thus

recognizing that the assets of the American branch at that time belonged to the German firm.

It is regarded as significant that the capitalization of the new company was only \$1,000,000, whereas the books show that on June 30, 1915, the assets exceeded the liabilities by \$3,200,000, so that the book value of each share of stock was more than \$300. Five shares of stock in the new company were issued to qualify directors and the balance of 9,995 shares were put into a voting trust, the voting trustees being Elkan and Frohnknecht, one Falck, bookkeeper of the concern, and a lawyer named Nelson.

Elkan became president of the new corporation and Frohnknecht the vice-president. The new corporation voted them exactly the same salary and the same percentage in the net profits of the business as was provided for them in 1912 agreement with the German firm.

Purchase of German Stock.

In the spring of 1916, when the war clouds began to look threatening in this country, Elkan and Frohnknecht engaged one E. O. Jacobson to go to Europe for the alleged purpose of purchasing from the German partnership 3,000 shares of the stock owned by the German partnership in the American corporation. They claimed that Jacobson bought this stock at \$80 a share and that they paid \$240,000 for it, paying \$151,000 in cash and transferring to the German firm \$50,000, which they had on deposit with it, and \$39,000 likewise on deposit on a subscription to the German war loan. Jacobson is said to be dead. The only receipt submitted by Elkan and Frohnknecht is for \$89,000.

It was claimed that Jacobson while abroad obtained from the German firm a power of attorney, pursuant to which he sold to the American corporation the 6,995 shares of stock left in the ownership of the German firm after the pretended sale of the 3,000 shares to Elkan and Frohnknecht. In other words, Jacobson was at the same time attorney in fact for Elkan and Frohnknecht, and for the German firm, and dealt with himself in both capacities. Acting under power of attorney for the German firm Jacobson sold to the American corporation, who apparently were only Elkan and Frohnknecht, the remaining 6,995 shares of stock.

Price Statements Contradictory.

Contradictory statements were made as to the price at which this sale was made. In the report to the Alien Property Custodian by Elkan and Frohnknecht, in which they undertake to give the history of this pretended sale, it is stated that the American corporation in January, 1917, purchased this stock out of its accumulated surplus, paying therefor the sum of \$700,000 in cash. It is also stated in the report that in addition to the \$700,000 approximately \$2,410,000 was paid by the American corporation to the German firm as "the balance of the original investment," the claim being that the German firm was willing to sell out its interest here for the amount of the original investment. Later Elkan and Frohnknecht claimed that the \$700,000 was not the amount of the purchase price, but that the purchase price was \$700,000 plus the balance of the original investment so paid back.

In the course of his investigation Mr. Garvan discovered that in July, 1916, Elkan and Frohnknecht each drew \$75,500 from the American corporation, thus making up \$151,000, which, added to the \$89,000 on deposit in Germany, enabled them to pay \$240,000 as the alleged purchase price for the 3,000 shares of stock.

Convinced Sale Was "Camouflaged."

Mr. Garvan became convinced that the sale of the German-owned stock in the American concern was camouflaged. It appeared that all of the money, with the possible exception of \$89,000 held by Elkan and Frohnknecht, came from the treasury of the American corporation, which in turn was owned by the German partnership. It appeared also that for the sum of \$240,000 Elkan and Frohnknecht purchased a property that during the year in which they purchased it yielded a profit of \$2,000,000.

In fact there was considerable doubt as to whether more than \$89,000 of this purchase price was actually paid. In January, 1917, when the purchase was supposed to have been made, the American corporation had net assets over all liabilities amounting to \$4,866,000, and the profits of the corporation in 1916 were \$2,000,000. Thus it would seem that the German partnership took about \$3,000,000 of \$4,866,000, made a present of \$1,866,000 to Elkan and Frohnknecht, in addition to giving them the business which in one year made a net profit of \$2,000,000.

That the Germans knew that the sale was only a pretended and pro forma transaction is shown by a wireless which they sent to one Harry Falck, an employee of the American branch, acknowledging the receipt of part of the \$240,000. In that wireless they referred to the shares as "pro forma Jacobson shares." The following is the wireless:

"Berlin, November 26, 1916, 9.25 p.m.

"Harry Falck,

"61 Broadway, New York.

"Friday, 24th. Don't sell now steels. below 110. Understood your remittance kronen 340,000 Knauth Nachod 290,000 mark against proforma Jacobson shares, but will not arrange for balance shares same kind. Wire whether arrangement White made as per our letter 7544. How is phosphate position and domestic market Could you sell part stock domestic?"

"Beer, Sondheimer."

Among other steps to hide the alien character of the assets of this concern was a purported consolidation of the New York corporation with another corporation called Pendennis Metals Corporation.

The Pendennis corporation was a mere shell, which was organized for the very purpose of consolidating it with Beer, Sondheimer & Co. It had no assets; only \$1,000 worth of stock was ever issued, and the stockholders were clerks in the office of the lawyer under whose supervision the consolidation was effected.

Vogelstein Naturalized Citizen.

Ludwig Vogelstein is the head of L. Vogelstein & Co. He is a naturalized American citizen. For many years he has represented in this country the firm of Aaron, Hirsch & Sohn, of Halberstadt, Germany. He had charge of their business in the United States, Canada, and Mexico. The concern did a very large business, the average for the past three years being about \$70,000,000 a year. He had an arrangement with the German firm whereby he received a share in the profits made upon the firm's business in America. His interest in the profits was about 15 per cent. and he also had an interest in the profits of this firm's business in Germany. These profits were determined annually from accounts rendered at the end of each year. Vogelstein claims that since 1915 he has been unable to get an accounting from the German firm.

Up to December, 1916, the American branch was conducted as a partnership and Aaron Hirsch was one of

the partners. In December, 1916, Vogelstein formed a New York corporation, capitalized at \$5,000,000. All the property of the partnership was transferred to the corporation, including, according to Vogelstein, the accumulated profits belonging to the German firm, which, in April, 1916, amounted to upward of \$1,600,000.

Vogelstein claimed that in April, 1916, his agreements with the German firm were terminated, but the Alien Property Custodian declined to accept that statement and contended that the interest of Aaron Hirsch & Sohn in the American business has continued to date and that except for Mr. Vogelstein's participation in the profits, all of the assets of the American concern belong to the German firm.

Large Quantities of Copper Stored.

Mr. Garvan in his investigation discovered that Vogelstein & Co. had stored large quantities of copper for delivery after the war to Aaron Hirsch & Sohn. He also found that the latter concern had guaranteed notes for several hundred thousand dollars given to a New York bank by L. Vogelstein & Co.

When Vogelstein formed the corporation he recognized that Aaron Hirsch & Sohn owned at least some of the stock, and the entire \$5,000,000 of capital stock was placed in the possession of Vogelstein's attorneys to await an accounting with the German firm at the end of the war. Mr. Palmer has taken possession of the entire \$5,000,000 of stock and has taken control of the business.

MONTANA COPPER SMELTERS AGAIN PRODUCING 1,000,000 LB. PER DAY.

Reports of the production of copper in Montana in 1918, according to V. C. Heikes, United States Geological Survey, Department of the Interior, indicate that the State will this year make an output equal to that of 1916, which was more than 352,000,000 pounds. The output in 1917 was about 278,000,000 pounds. The large copper mines at Butte gradually regained their normal output in 1918, reaching it in February, and the smelters in Montana were said to be producing copper in May at the rate of more than 30,000,000 pounds a month. Early in 1918 the Anaconda Co. was producing copper at the rate of nearly 27,000,000 pounds a month, and the East Butte Co. at the rate of 2,300,000 pounds a month. Though many mines resumed operations in 1918, the High Ore mine, which has been producing 1,900 tons of ore daily, was closed in June to permit the shaft to be concreted. The North Butte and the Davis Daly mines are making improvements in equipment and are increasing their shipments.

MANGANESE AT COWICHAN LAKE, B.C.

Manganese has been discovered in the vicinity of Cowichan Lake, Vancouver Island, and, according to report, there is a considerable deposit of the ore. The locator is a Mr. Douglas, the staker of the Blue Grouse Copper Claims, Cowichan Lake. Nothing definite is yet known of the new property, but those interested are enthusiastic and a mining engineer will make an inspection immediately.

CHROMITE FROM CASCADE, B.C.

The chromite claims of Cascade, B.C., are being operated by the Stewart-Calvert Co., which recently acquired them. Small shipments, totalling 150 tons, have gone forward to Niagara, Ont., and Pittsburg. Another 100 tons is ready for shipment.

ONTARIO GOLD AND SILVER MINES AND GOLD AND SILVER MINING STOCK MARKETS.

The Ontario Bureau of Mines recently issued the following figures relative to the production of gold and silver from the Northern Ontario Camps:

Government returns show a gold and silver production for 1917 of \$25,000,000 in value.

The total gold production to date is valued at about \$37,000,000 and the silver production at \$152,000,000.

The total dividends and bonuses paid to shareholders to the end of 1917 were \$71,200,000 from the Cobalt Silver Camp and \$11,500,000 from Porcupine and Kirkland Lake Gold Camps, or a total of \$82,700,000.

These are huge figures and yet the mineralized section of Northern Ontario has only been developed to the producing stage in three or four comparatively small areas. A vast extent of territory is entirely undeveloped though several new districts are at the present time being explored by the older established mining companies as well as by syndicates and individuals with a view to opening up new deposits of gold and silver.

It may be said, without fear of serious contradiction, that the chief companies producing gold and silver in quantity are ably, efficiently and economically administered and several of the large producers are carrying on exploration work in new gold and silver districts with a view to prolonging the productive life of their organizations. This must be considered a wise policy, as the acquisition of new producing territory tends to make the shareholders' dividends more secure and to add to the stability of their investment. A further advantage, both to the Government and the shareholders, is that administrative ability and mining brains, combined with ample capital, insure intelligent, efficient and thorough development of Ontario's north country which has been proven to be so rich in mineral resources.

Many changing economic conditions have made it increasingly difficult to carry on mining and exploration work in the North country. Chief among these is the scarcity and high price of labor (accompanied in many cases by a marked decrease in efficiency); the high cost and slow delivery of materials and machinery, and the fixed price of gold. As against these features, the rapid rise in the price of silver has enabled the silver producers to meet these adverse conditions and has encouraged them to increase their output.

Gold properties are finding it increasingly difficult to carry on operations, several producing mines having cut off dividend payments and others having closed down altogether. The gold mines are in somewhat the same position as traction companies who have a fixed rate of fare and rapidly mounting operating expenses.

This condition is causing grave anxiety to the different Governments who have made huge issue of gold bonds and it is understood that discussions are now under way to find some means to, at least, maintain, if not increase, gold production. Many suggestions have been made to obtain larger production such as: Chinese labor, bonuses to producers, remitting taxes, etc. It is a difficult question to adjust as long as cost of production continues to increase, as gold—the basis of all values—must remain stationary.

Notwithstanding many adverse working conditions and difficulties, the Northern Ontario mines have during the war period added very materially to the prosperity of Ontario as a whole and will undoubtedly

continue to do so for very many years to come. New producing areas are developed to a large extent by individuals or syndicates providing the necessary financial backing and every possible safeguard should be provided to protect this important source of development money and see that it gets a "square deal." Speculators are satisfied, usually, if they get a fair chance and have assurance that their money goes into legitimate development work.

While increased cost of labor and material must be faced as a result of war conditions and the consequent high cost of living, there are other adverse conditions which the Government can and should control. The wonderful dividend record mentioned above has attracted certain unscrupulous and self-styled mining brokers and promoters. Their operations begin with the securing of a Government Charter and a lot or two of worthless land. Circulars issued widespread contain the most reprehensible statements about profits to purchasers of the shares. The results are large profits to the "broker," very little, if any money for development and, in most cases, total or large loss to the unfortunate investor. Operations of this class are not infrequent although absolutely prohibited by law.

Misrepresentation of this kind, with consequent heavy losses to a very large number of investors in Canada and the United States, has given these brokers a bad name. It has also caused a feeling that investments in mining securities are dangerous. Many legitimate investors and speculators have been driven away from mining securities on account of lax and questionable methods employed in their purchase and sale. This attitude towards mining securities is widespread and the blame must be placed firstly, on the mining brokers themselves on account of the methods employed by some of them in buying and selling and, secondly, on the legal department of the Government which appears unwilling to put laws, already on the Statute books, into effect.

Ontario has a great heritage in the North Country and everything possible should be done to protect legitimate development work and the legitimate mining investor and put a stop to unscrupulous exploitation.

RICE CAUGHT AGAIN.

New York, Aug. 1.—George Graham Rice, former convict, who is now in the stock brokerage business, was arrested last night, charged with using the mails to defraud.

The specific complaint was lodged by R. W. Hartman, of Mansfield, Ohio, who alleged he entrusted \$721 to the prisoner for the purchase of stocks.

Rice, whose true name is Herzog, was arrested on a warrant issued by direction of Postoffice Inspectors McQuillan and Hunsberry, who declared Hartman's complaint was one of many similar ones.

A "sucker list" of 53,000 names was one of Herzog's assets, Federal officials declared. His monthly office expenses aggregated \$200,000. An estimate of his income since his release from the penitentiary four years ago made by Federal authorities placed his profits at over \$2,000,000.

In order to stimulate the production of platinum in Canada, the Hon. Martin Burrell, Minister of Mines, has authorized the purchase of the metal at the Dominion Assay Office, Vancouver, B.C. It is believed that this arrangement will prove a great convenience to small producers who, in the past, have found it necessary to market their product in the United States.

MARKETS

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.50 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 12 cents per lb.
Aug. 13, 1918—(Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 10¼ cents to 10½ cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.
Aug. 13, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$10.50 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York cents.	London pence.
August 13	99½	48½

STANDARD MINING EXCHANGE.

(Messrs. J. P. Bickell & Co. report the following quotations on the Standard Stock and Mining Exchange, August 9, 1918.)

Gold.

	Bid.	Asked.
Apex .....	.02½	.02¾
Boston Creek .....	..	.20
Dome Extension .....	.11½	.12½
Dome Lake .....	.12½	.15½
Dome Mines	8.35	..
Imperial .....	.01¾	..
McIntyre	1.37	1.39
New Holly	4.55	4.59
New Ray .....	.15	.16
Porcupine Crown .....	.12	.12½
Porcupine Vipond .....	.12	.13½
Preston East Dome .....	.02	.03
Teck-Hughes .....	.14½	.15
West Dome .....	.09½	.10

Silver.

	Bid.	Asked.
Adanac .....	.06½	.07¼
Bailey .....	.03	..
Beaver .....	.23	.25
Buffalo .....	..	1.00
Chambers Ferland .....	.12	.13
Coniagas	2.40	..
Crown Reserve .....	.18	.19½
Gifford .....	.01¾	.02
Great Northern .....	.02¾	.03¾
Hargraves .....	.04¼	.04½
Hudson Bay	20.	29.
Kerr Lake	5.65	..
La Rose .....	.35	.38
McKinley .....	.38	.39½
Nipissing	8.60	..
Peterson Lake .....	.09¾	.10
Right of Way .....	..	.04
Seneca Superior .....	..	.02
Temiskaming .....	.30	.30½
Trethewey .....	.23	.25
Wetlaufer .....	.04½	..

Mining Corporation	2.00	2.25
Provincial .....	.46	...

NEW YORK MARKETS.

Aug. 7, 1918.

As quoted by Engineering and Mining Journal.

Copper, 26 cents.
Lead, 8.05 cents.
Zinc, 8.12 cents.
Tin—Banka, \$1.
Aluminum, 33 cents.
Antimony, 13¼ cents.
Bismuth, \$3.50.
Cadmium, \$1.50 to \$1.75.
Nickel, 45 cents.
Quicksilver, \$125.
Silver, 99½ cents.
Platinum, \$105.
Palladium, \$135.
Iridium, \$175.
Chrome ore, \$1.70 per unit for 50% ore.
Molybdenite, about \$1.00 per lb.
Pyrites, 25 to 34 cents per unit f.o.b. mine.
Tungsten ore, \$20 to \$24 per unit.
Ferromanganese, \$250 for 70%.
Spiegel Eisen, \$75 for 16 to 18%.

ALBERTA CAN SUPPLY COAL FOR ONTARIO.

In a letter to the "Globe," H. C. Anderson, of the Twin City Coal Co., Ltd., says: "At the present time it is a most conservative statement to say that Alberta could supply Ontario with 2,000 tons of choice domestic coal each day for the next six weeks at least. If the weather continues mild that quantity of coal could be shipped for the next sixty days.

GRANBY STRIKE SETTLED.

Victoria, B.C., July 29.—The strike at Anyox, B.C., the smelter centre of the Granby Consolidated Mining and Smelting Co., has been settled and the plant is in operation again after two weeks of comparative inactivity. Mr. F. M. Sylvester, general manager, issued the following statement dealing with the walk-out: "The return to work of the men at Anyox is consistent with the usual good sense and spirit of fair dealing that may be relied upon to a large degree in Granby employees. While we deplored a shutdown of the plant at this time, when Allied demands for munition materials, including copper, is at its highest, making it necessary, as it did, for us to curtail the regular shipments of our quota of copper and thus augmenting the already substantial decrease of copper produced during May, June and July, we believe that much good will result from the vacation of the last two weeks. For some time, more than a year I would say, we have known that sinister influences have been at work at Anyox, among the men, both at the beach, where the smelter is located, and among the miners at the mine camp. You may call that influence by any name you like, I. W. W. 'ism, social unrest, or pro-Germanism."

GOLD BANNER.

The consent of the Finance Minister, permitting the Gold Banner Mines to sell stock, has been withdrawn. The Gold Banner Mines, Limited, in their prospectus represented the Finance Department's sanction of the flotation as placing on the enterprise itself the seal of government approval, which, of course, was never intended.

PERSONAL.

Mr. A. Anrep is at Cobalt to investigate peat bogs along the line of the T. & N. O. Railway.

Mr. J. A. Allan, of the University of Alberta, Edmonton, was in Toronto last week. He spent the early part of the summer in the Peace River district.

Mr. L. H. Colé, of the Geological Survey, is in South-western Ontario, investigating sand resources.

Mr. R. C. Wallace and Mr. J. A. Campbell, the newly appointed and retiring Commissioners of Northern Manitoba will make a trip to Hudson Bay, starting this week.

Mr. Albert E. Hall is in France with the U. S. army.

Mr. R. G. McConnell, Deputy Minister of Mines, is on a visit to Western mining districts.

Mr. D. H. McDougall succeeds F. H. Crockard as President of Nova Scotia Steel & Coal Co.

Mr. F. W. Gray has joined the staff of the Nova Scotia Steel & Coal Co.

Mr. L. R. Campbell has been elected president of McGillivray Coke & Coal Co.

Mr. J. L. Parker is general manager for the Diamond Coal Co., Diamond City, Alberta.

Dr. Alfred Stansfield has returned to Montreal from British Columbia, where he has been working in connection with the proposal to establish an iron industry.

Dr. F. D. Adams is in London, attached to the staff of the Khaki University.

Mr. E. L. Bruce, of the Geological Survey, is examining the area between Reed and Herb lakes, Northern Manitoba.

Mr. M. Y. Williams is making geological surveys of oil districts in southeastern Ontario.

Mr. A. Wende has returned to Kirkland Lake after a visit to Buffalo.

Mr. Robert Bryce was in Cobalt last week.

Mr. T. J. Harwood, recently manager of the Schumacher mine, has gone to Los Angeles.

Mr. H. B. Lee, recently manager at the Porcupine Crown mine, has been appointed lecturer in Metallurgy in Pennsylvania State University.

Mr. R. L. Baker, of Toronto, succeeds the late A. M. Hay as a director of West Dome Mines.

KEELEY MINE SOLD.

The old Keeley mine which came into such prominence at the time of the Farmers' Bank smash, has been purchased for \$100,000 by the Associated Goldfields Co. of West Australia, an Old Country concern, which was working it under option prior to the war. An extension of time was asked until one year after the cessation of hostilities, by the buyers. This was granted and the property then closed. The purchasers, however, have now taken up the option of the South Lorrain property, which is being worked with increasing vigor. M. Black, formerly mill superintendent at the Porcupine V. N. T., being in charge.

TEMISKAMING BOUNDARIES CHANGED.

The Temiskaming mining division now embraces the townships of Strathy, Stratheona, Law, Olive, Milne, Askin, Riddell, Cassel and all that part of the Temagami forest reserve lying east of the Temiskaming and Northern Ontario Railway. The new order went into effect August 1.

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HOW UNCLE SAM IS ENLISTING COAL MINERS.

The United States Fuel Administration has issued the following:

In order to supply leaders for an intensive campaign for increased bituminous coal production the United States Fuel Administration is appointing in each of the producing districts throughout the country a man to serve as production manager for his district. At each mine a committee of six, to be known as the production committee of the United States Fuel Administration, will be formed; three men representing the mine workers; three men the mining company.

The duties of the production committees will be to stimulate patriotism; to set a good example of patriotic industry; to arrange for local meetings at which patriotism and increased production alone shall be discussed. It is the task of the production committee to make known the fact that there must be a large increase in tonnage if the United States is not to fail in its war work. It will also make clear that it is the duty of every mine worker to work the full prescribed hours during six days each week; to pass upon the reasons given for absence, short hours worked, or any other causes that may have resulted in a loss of tonnage.

In announcing the formation of these production committees James B. Neale, director of production, wrote to the local unions of the United Mine Workers of America:

"You mine workers are like a great reserve army which shoulder the burden of a long campaign in which there can be no let-up or the whole offensive plan will crumble and collapse. Not a man of you would flinch or hang back if he were in France to-day and the order came to advance in the face of the enemy's machine guns. In the same way I am sure you will not falter

when you realize how great the need is for your best efforts at home."

SHIPPING MANGANESE ORE FROM KASLO, B.C.

Col. B. F. Millard, of Seattle, Wash., who is operating a manganese property near Kaslo, B.C., states that in shipments thus far, water in some cases ran over 40 per cent. A drying plant, therefore, is being installed. It is expected that 2,000 tons will be taken out this summer, which was all the ore in sight, although more might be located with prospecting. The ore is being shipped to Pennsylvania.

TESTING GAS FOR GASOLINE SUPPLY.

The natural gas of both Northern and Southern Alberta is to be tested as to its value as a source of gasoline. The work is to be carried out under the direction of Mr. D. B. Dowling, of the Canadian Geological Survey Branch, Mines Department, Ottawa. A start is likely to be made at the Dingman Well, south of Calgary City, to be followed by similar tests in the Viking and Peace River Fields.

PYRITES PROPERTY FOR SALE

A pyrites property of exceptional merit, well located, one mile from main line of railway, handy to water transportation, and unlimited electric power.

Only cash proposals considered. For information and samples of ore, write Box Y, care of The Canadian Mining Journal.

WANTED—

Copper Refiner, to take charge of copper cathode melting plant, casting various shapes, including wire bars. A practical furnaceman, who knows from years of actual experience how to fuse in a bottom, how to train a crew of "green" men, and can himself produce marketable copper, can secure a steady position, and a satisfactory salary, with a responsible smelting company. Apply Box N Canadian Mining Journal.

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ONE DOUBLE SET OF TOOTHED ROLLS, 22 in. diam., 20 in. face. Suitable for reducing any soft material. Complete with drive pulleys, spare shells, gears, springs, etc.

ONE SET PLAIN ROLLS, 23 in. diam., 12 in. face. Suitable for any fine reducing. Complete with drive pulleys, and one set of spare roller shells.

Both machines are as good as new, having run only four months, and are open to inspection.

Will consider any offer. Write for further particulars.

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One Litchfield Hoisting Engine, 18 in. cylinder, 32 in. stroke. Two 5 ft. drums with 4 ft. face and grooved for 1 in. rope. In excellent condition. One "WC" Sullivan tandem Air Compressor. Compound steam and two stage air cylinders. Corliss Valve Gear. Capacity 1,800 cu. ft. to 100 lbs. pressure per minute. For full information and price, address:

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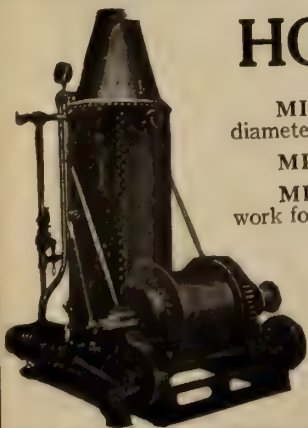
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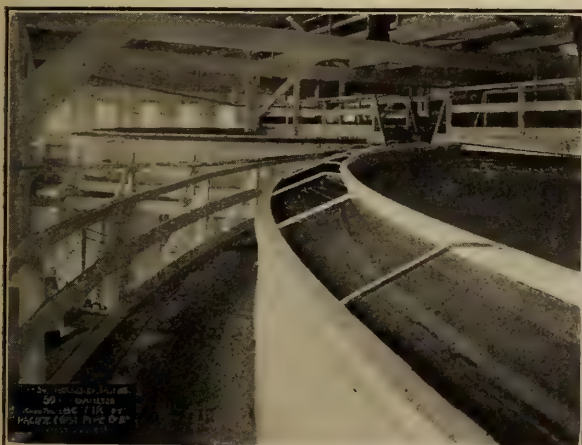
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- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

THE recent decision in the Butte & Superior Suit with Minerals Separation has an important bearing upon the use of the Pneumatic, or Callow method of flotation.

The Appellate Court's decision at Philadelphia, in the Miami case, had already made clear the distinction between (1) froth produced by violent mechanical agitation of the Minerals Separation process, and (2) simple levitation by air bubbles, as practised in the Callow or pneumatic cell, without such agitation.

Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

Both the use (1) of oil in excess of ten pounds (0.5%) in combination with violent agitation, and (2) the use of the Callow system of aeration with any quantity of oil, appear therefore to be immune from any charge of infringement.

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- Monel Metal—**
International Nickel Co.
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Hoyt Metal Co.
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Canada Metal Co.
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ting—**
Imperial Brass Mfg. Co.
- Perforated Metals—**
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Hendrick Mfg. Co.
- Pig Tin—**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead—**
Canada Metal Co., Ltd.
Hoyt Metal Co.

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Pipe—Wood Stave— Pacific Coast Pipe Co., Ltd.	Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Can. Allis-Chalmers, Ltd. Smart-Turner Machine Co.	Separators— Smart-Turner Machine Co.	Tanks (water) and Steel Towers— Gould, Shapley & Muir Co., Ltd.
Piston Rock Drills— Mussens, Limited. Can. Allis-Chalmers, Ltd.	Pumps—Turbine— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	Sheet Lead— Canada Metal Co., Ltd.	Tramway Points and Crossings— Hadfields Ltd.
Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	Pumps—Vacuum— Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd. Mine & Smelter Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Hadfields Ltd.	Shovels—Steam— M. Beatty & Sons.	Transformers— Can. Gen. Electric Co., Ltd.
Pulleys, Shafting and Hangings— Northern Canada Supply Co.	Rails— Hadfields Ltd.	Smoke Stacks— Can. Allis-Chalmers, Ltd. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Marsh Engineering Works.	Tubs— Hadfields Ltd.
Pulverizers—Laboratory— Mine & Smelter Supply Co.	Roofing— Northern Canada Supply Co.	Steel Barrels— Smart-Turner Machine Co.	Turbines— Escher Wyss & Co. Can. Allis-Chalmers, Ltd.
Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Steel Castings— Hadfields Ltd.	Twist Drills—High Speed— Can. B. K. Morton Co.
Pumps—Centrifugal— Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Mine & Smelter Supply Co.	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton.	Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	Welding Rod and Flux— Imperial Brass Mfg. Co.
Pumps—Electric— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	Rolls—Crushing— Hadfields Ltd.	Steel Drums— Smart-Turner Machine Co.	Welding and Cutting, Oxy-Acetylene— Imperial Brass Mfg. Co.
Pumps—Sand and Slime— Mine & Smelter Supply Co.	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son. Mine & Smelter Supply Co.	Steel—High Speed— Can. B. K. Morton.	Wheels and Axles— Hadfields Ltd.
	Screens— Northern Canada Supply Co. Hendrick Mfg. Co. Hadfields Ltd.	Steel—Tool— N. S. Steel & Coal Co. Hadfields Ltd.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Marsh Engineering Works.
		Stone Breakers— Hadfields Ltd.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		Surveying Instruments— C. L. Berger.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
		Switchboards— Can. Gen. Electric Co., Ltd.	Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.
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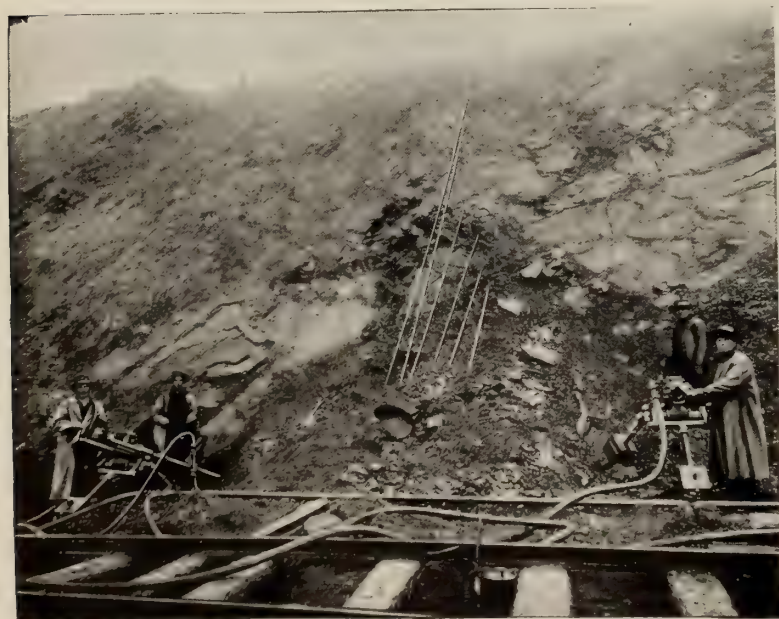
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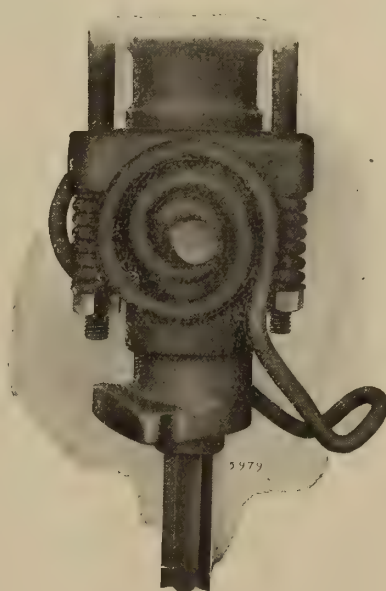


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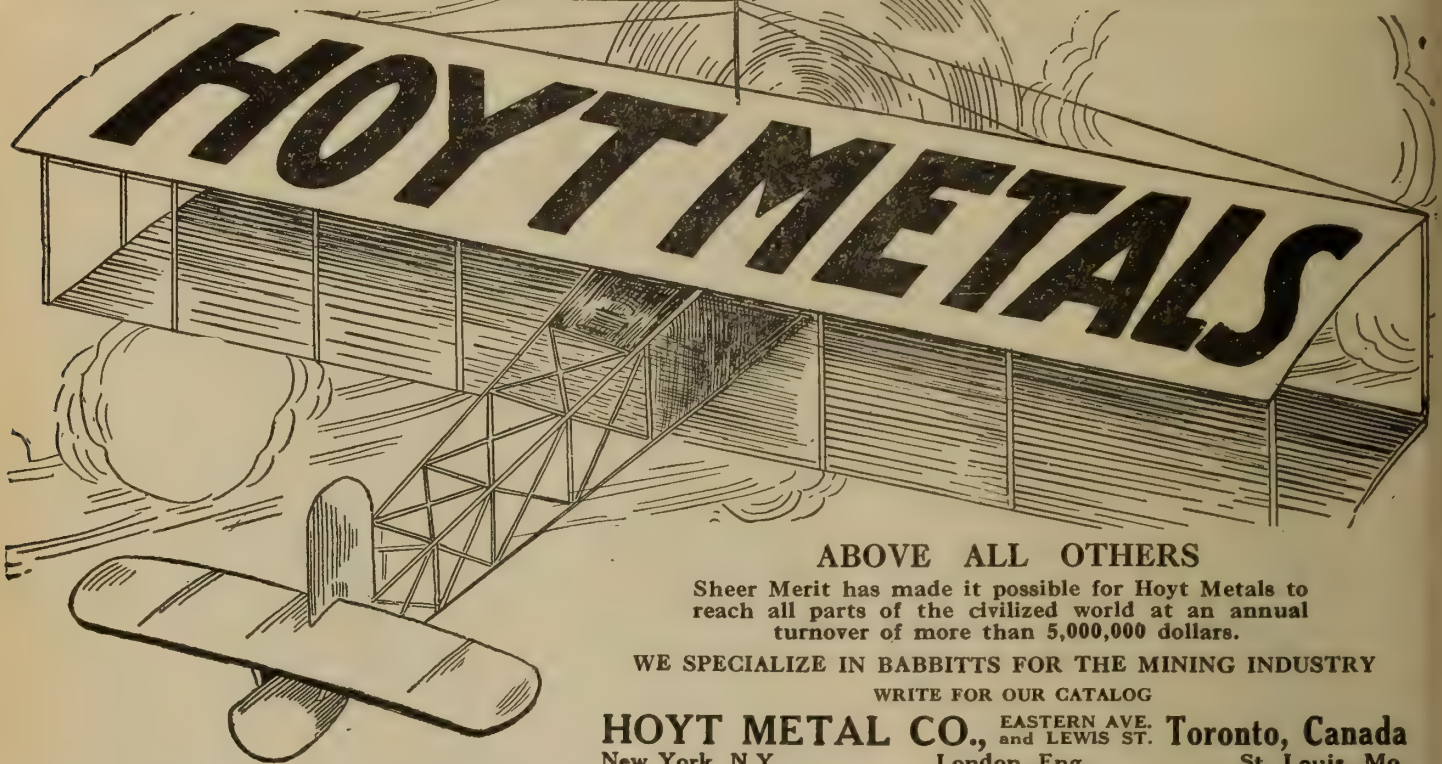
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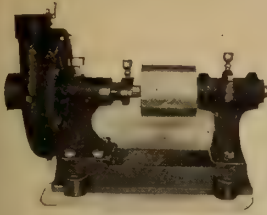


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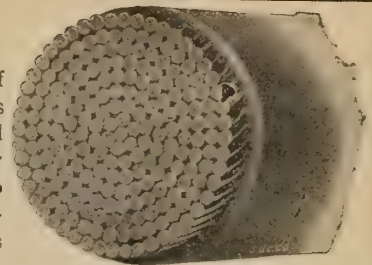
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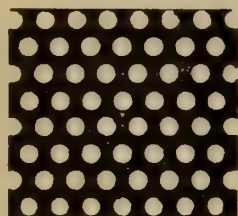
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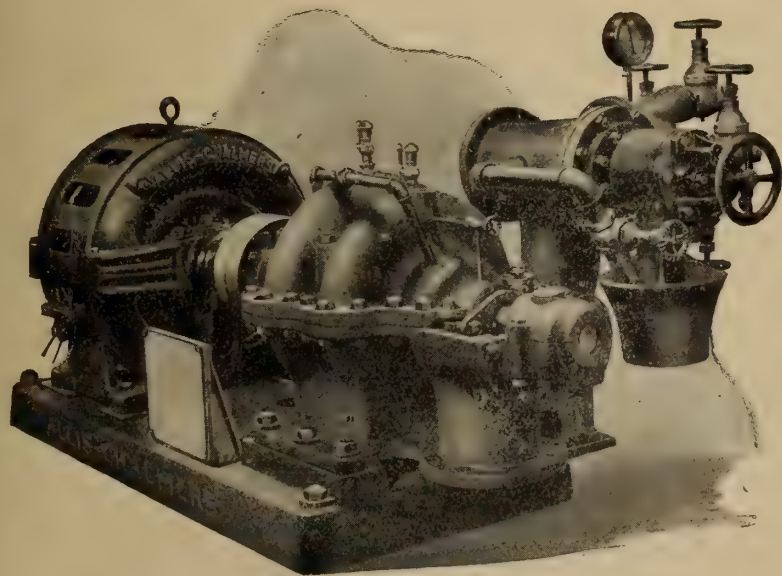
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

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Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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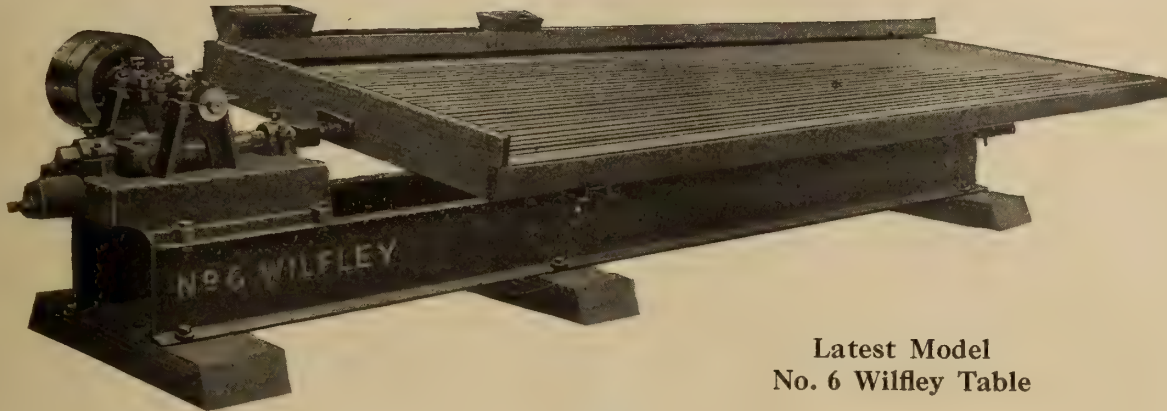
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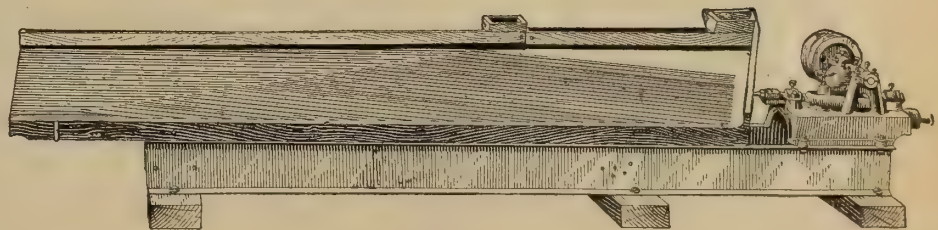
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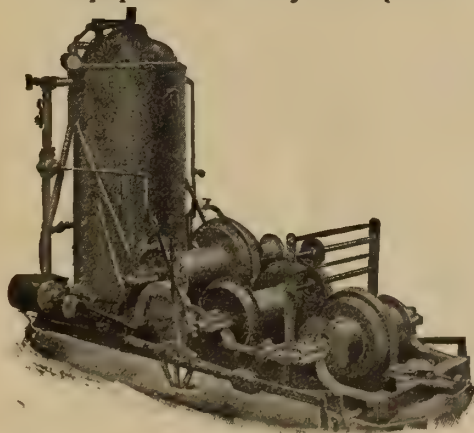
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Speaking at the opening of the National Exhibition at Toronto Lord Shaughnessy said: "It will be necessary to establish a good relationship between employers and employees, and a unity all round for the commonwealth. Everything that will enable us to overcome all difficulties must be closely studied, and, where changes are necessary to meet conditions, we may be relied upon to make them without delay." Better understanding between labor and capital is generally believed to be one of the big results of the war, and it is interesting to note that the head of our biggest corporation is taking a leading part in the endeavor to solve in the interest of Canada the problems of the immediate future.

U. S. MINERS TAKE PLEDGE.

"So long as the war lasts I'll stick to my job and do an honest day's work, six days a week and overtime if necessary. I'll do anything else the President of the United States asks me to do. So help me God."

This pledge has been taken in scores of great establishments in the United States and is being adopted in the coal regions. Recently at Butte it was taken by 10,000 men as the miners were lowered underground.

COAL THE KEY TO VICTORY.

During recent weeks there have been a number of interesting statements made concerning the part that coal is playing in the war. The message from Marshal Foch to the meeting of the Coal Miners' Federation at Southampton should help to divert more attention to the necessity of producing coal.

In England, Baron Calthorpe, the Coal Controller, says that the supply was 36,000,000 tons short this year and several million tons will be required annually for the American army in France. Increased output is being planned for and consumption will be kept down by a rationing plan.

In the United States the fuel administration has announced the appointment of 28 production managers. Each will have charge of the campaign for increased production in his district. To him will report a committee of six, three representing mine management and three representing workers. Where a mine is failing to produce maximum tonnage it will be up to the production committee to learn the cause and institute improvement. Each week the committee will post names of the men who have been absent, who have worked short hours or have loaded less than a fair amount of coal.

In the United States there is recognition of the fact that coal is a basic necessity in the manufacture of munitions of war. The War Industries Board is urging increased coal supply as one of the chief needs for improving the supply of steel, in which there is a great shortage. The enormously increased demand for steel must obviously result in a greater shortage of coal than has yet been experienced.

The situation in Canada is again reviewed in this number of the Journal by Mr. F. W. Gray. During the past three years Mr. Gray has time and again pointed out clearly the folly of ignoring the falling off in production of coal. He has drawn attention to the reasons for the decline and has particularly emphasized the inadvisability of taking so many experienced miners from their work just because they were so willing to share the dangers and hardships in the field of battle. He has repeatedly pointed out that these men, while excellent soldiers, would be better employed at mining coal. In this number he points out that Canada is more in need of a Fuel "Booster" than a Fuel "Controller."

Commenting on the coal shortage, "Saturday Night" says: "Our coal miners are working short hours for huge pay, with the result that they feel that they can afford to loaf a good share of the time, with the result that production is far below normal." "Saturday Night" should retract that statement. Our coal miners

are not responsible for the decrease in production. Many of the best of them are to-day in France. Those that are at their regular occupation are working faithfully and they are not getting "huge pay." Of necessity, on account of the heavy drafts of experienced miners, a larger than usual number of inexperienced men are employed in the coal mines and some experienced aliens are probably loafing; but, as Mr. Gray points out, the coal miners are doing very well and the statements of "Saturday Night" are inaccurate and misleading. The shortage of coal in Canada may be to some extent relieved by appealing to the miners to do more work than usual; but it is absurd to place on the shoulders of the men in the mines the responsibility for the shortage.

The National Exhibition at Toronto opened on August 26th. As usual one of the notable features is the exhibit of minerals of Ontario by the Provincial Bureau of Mines. The educational value of such an exhibit is very great, and it is to be hoped that other parts of the Dominion will be more adequately represented on future occasions.

While the Ontario Bureau of Mines does well in showing mine products at the National Exhibition, the Mining Industry is nevertheless very poorly represented. When we consider that, next to agriculture, mining is Canada's greatest basic industry, it is reasonable for visitors at this great exhibition to expect to see not only a collection of minerals but working models of mines and metallurgical works, and a big display of the machinery used in mining, milling, smelting, and refining operations. The Exhibition is a great success year after year, but it would be more instructive if more attention were given to mining and other basic industries. Is it too much to expect that there will some day be a building devoted to exhibits of the mining industry? We believe that an attempt to show methods used in mining and treating ores would not only be instructive; but would prove to be one of the most attractive exhibits on the grounds.

LIGNITE UTILIZATION BOARD APPOINTED.

According to a Canadian Press Despatch, dated Ottawa, Aug. 22, Hon. Martin Burrell, Minister of Mines, has announced the appointment of the Lignite Utilization Board, which will deal with the problems concerned with the further development and use of deposits of lignite coal in the west.

The appointment of this board, said Mr. Burrell, is the result of negotiations which took place some time ago between the Governments of Saskatchewan and Manitoba and the Federal authorities. The Council for Scientific and Industrial Research and the Department of Mines have for a long time past been closely investigating the possibilities of carbonizing and briquetting lignite coal to make it most suitable for household use, as well as the question of producing by-pro-

ducts such as oil, pitch, ammonia, sulphate and gas. A solution of these problems which would be a commercial success is most desirable. An order in Council was passed some time ago authorizing the Minister of Mines to enter into an agreement with the Governments of Saskatchewan and Manitoba, which should provide that they would contribute one hundred thousand dollars each and this Government two hundred thousand for the purpose of establishing an experimental plant and for investigating and experimental work whether before or after the establishment of the said plant, as might be deemed necessary or advisable.

The matter was somewhat delayed during the absence of the Prime Minister of Manitoba in England, but the agreement was accepted by all three Governments recently and a board has now been appointed. Its Chairman will be Mr. R. A. Ross, Consulting Engineer of Montreal, who, in addition to his wide experience as an engineer, has taken a keen interest in the problems under consideration and has been an active member of the Council for Scientific and Industrial Research. The other two members will be Mr. J. M. Leamy, of Winnipeg, Manitoba, Provincial Electrician, and Mr. J. A. Sheppard, a well-known business man of Moose Jaw, Sask.

THE PEACE RIVER DISTRICT.

The Peace River District has been for many years the subject of much interest and speculation. Alluring tales from adventurous pioneers, of its wonderful resources, charming climate and varying scenery, have long since lent to the district that charm of romance which distance and uncertainty blend with glowing promises. Now, however, the land so long famed by legend and mystery is being proved a reality, modern transportation having, so to speak, brought it to our very doors. A journey from Edmonton to the town of Peace River, for instance, which five years ago consumed nearly two weeks of toil and hardship, may now be made in less than twenty-four hours, in comfort at all times of the year. Trains to this latest settlers' Mecca, which is nearly 1,000 miles north of the international boundary line, carry both sleeping and dining car accommodation.

The Department of the Interior, through its Natural Resources Intelligence Branch, has prepared and is distributing a new illustrated report on the district based on investigations made by an official of that Branch during the season of 1917. The publication contains interesting information with regard to climate, soil, agriculture, minerals, game, water powers, transportation, and education. A map of the district showing general topography also accompanies the report.

The recent reservation in the interests of soldier settlement of available Dominion lands has also necessitated the preparation of a map which would show the area in Northern Alberta that had been reserved for such purpose. This publication is now available for distribution, and should prove of considerable value to the returned soldier who is considering the advisability of settlement in the Peace River country, likewise to the prospective homesteader, as it shows the area within which homesteads may be procured, also the total number of quarter-sections that are still available in each township within reasonable distance of a railway. A copy of the report, or map, or both may be procured free of charge upon application to the Natural Resources Intelligence Branch of the Department of the Interior, Ottawa.

The Coal Shortage

By F. W. Gray.

A disturbing amount of misinformation is being circulated about the shortage of coal in Canada and in the United States. The statements which are being made are characterized by bias and entire misconception, and it is therefore refreshing and at the same time reassuring to find that President Wilson correctly appraises the situation, as he seems able to appraise most situations. President Wilson's statement, in part, is as follows: "The existing scarcity of coal is creating a grave danger—in fact, the most serious which confronts us, and calls for prompt and vigorous action on the part of both operators and miners. Without an adequate supply of coal our war programme will be retarded; the effectiveness of our fighting forces in France will be lessened; the lives of our soldiers will be unnecessarily endangered, and their hardships increased, and there will be much suffering in many homes throughout the country during the coming winter."

President Wilson is not given to over-statement, or alarmist messages. When he states that the coal shortage situation is "the most serious which confronts us" it does not seem that his language could be exaggerated. Many serious situations confront the Allies, which it is unnecessary to enumerate, but here we have the executive head of a great and powerful nation stating that nothing is more important than coal.

Readers of the "Journal" well recollect that an identical statement has been made by the writer, and repeated almost 'ad nauseum' from time to time during the duration of the war. A few weeks ago we wrote: "Steel, wheat, ships, guns, shells, men, money—all these things and many others—are but a transmutation of coal, merely the finished product of materials that have been mined, assembled and manufactured with the help of coal. Coal is basic, fundamental. When will the fact be realized?" Lloyd George stated it three years ago. President Wilson has again stated it. And yet it would be difficult to point to any action on the part of our own Government or on the part of the Government of the United States, to remedy the shortage, or to attack the problem at its roots.

The Fuel Controller in Canada, the Fuel Administrator in the United States, and the Coal Controller in Great Britain, have done many and useful things in co-ordinating the transportation facilities, and by the adoption of zoning arrangements have done away with a great deal of overlapping and duplication of effort in the matter of transportation. Great energy has been expended on price fixing for the protection of the public in the matter of the cost of coal. In neither of these courses, however, has there been any attempt to increase the production of coal. Price fixing has in a good many instances had the direct effect of discouraging production. In the case of a product so fundamental as coal, great care should have been exercised—much greater care than has been exercised—to preserve the encouragement to production which always accompanies the retention of the element of gain and profit. It is far, far preferable that the public should pay more for its coal than that coal production should decline.

So far as Canada is concerned the very title "Fuel Controller" expresses a misconception, unless indeed the Government had more in mind the importation of coal from the United States than the encouragement of production at home. What we need in Canada is not a

Fuel "Controller," but a Fuel "Booster." The coal industry does not require controlling, or restricting in any way. It needs to be encouraged, to be enlarged and amplified to the utmost extreme.

As an example of complete misconception of the cause of the coal shortage witness the Hon. Frank B. Carvell's recent statement that the miners in Canada are only working 75 per cent. of their time, and are getting such large wages that they can afford to loaf the rest of the time. This is a sweeping, and evidently unconsidered statement. So far as Nova Scotia is concerned, the record of the miners will bear comparison with that before the war. As the writer has only recently pointed out in the "Journal," the tons produced per miner per day is exactly what it was for years before the war. Their performance shows an average efficiency, or perhaps a slightly increased efficiency when compared with pre-war records.

The reply of the miners of Nova Scotia to Mr. Carvell very properly resents his reflections upon them, but here again we find mis-statements and bias. The miners state that the coal companies are unable to take away the coal produced by the miners "on account of shortage of material, such as rails, nails, sleepers, boxes, etc., compelling experienced miners to lose time occasionally on this account."

This statement is full of inaccuracies and a moment's reflection will show that this is so, because no coal operator, whose business and sole occupation is the production of as much coal as possible, would tolerate a condition that limited the output of coal if it were within his power to remove it.

The fact we have just quoted, namely, that the coal miners are producing exactly the tonnage per man that they produced as an average performance for years before the war, and also during the war, is sufficient refutation of any statement to the effect that there is restriction of the production of the individual miner at the coal face.

What, then, is the truth regarding the coal shortage and its cause? No situation is entirely simple, and there are a number of causes which have assisted to bring about the decline in coal production, but the chief cause—the cause that is so outstanding in its effect as to belittle all the other accessory causes—is the enlistment of miners. By miners we mean men actually engaged in digging coal at the working face. The men employed on the surface and in the same proportionate numbers as the mining coal class.

What is the remedy? Unfortunately, there is no remedy. Palliation of the evil is all that is possible. Some little can be done by the introduction of mechanical devices in substitution for manual labor, but this course can only have a very limited application. Some help can be given by transferring surface employees and auxiliary workmen underground into the mining coal class, but not much is possible in this direction, because the men who are not to-day employed in mining coal are of such a category physically and as to age as to debar them from the work of mining coal. More can be done by closing down small collieries, and concentrating the miners in the larger and more economically worked collieries. This course will throw some men out of employment more or less permanently, but it would give more coal and cheaper coal if followed out rigorously and logically. This is about as far as palliative measures can be carried.

As it is manifestly impossible at this stage of the war to return to the mines the miners who have been enlisted in the armies, it is also manifestly impossible to restore the coal production to pre-war figures during the further duration of the war. One course is possible, namely, to stop all further enlistments of miners. In 1915 and 1916 the writer pointed out on many occasions that the enlistment of miners was going on to an alarming degree, and out of all proportion to the rest of the population of Canada, and stated that the damage thereby being affected was irremediable for the further duration of the war. Nevertheless, in the application of the Military Service Act the authorities did not except miners, and notwithstanding the dangerous reduction in coal production which had taken place by October, 1917, a large number of coal producers have been since taken by the selective draft. The Canadian Government properly said they considered the military danger was such as to overshadow the necessities of industrial production, and they refused the application of the farmers who made such dramatic and persistent attempts at Ottawa to have farm workers excepted. But coal production is not an industrial matter to-day—and, moreover, since this war started it has never been an industrial matter. It is a military matter, the first of all military matters in a modern war. Look back over the history of the war. In 1914 the first step after the mobilization of the fleet—which, it is to be remembered, was mobilized by the aid of coal—was to guard the Empire's credit and exchanges. The most important single item in the matter of maintaining Britain's credit and the exchange rate has been coal, for coal and gold are interchangeable terms when exchanges are in question.

In 1915 we were told the chief need was for high explosives and artillery. The munitions question is merely a phase of the coal supply, for whether guns, shells and high explosives were made in England or America, their origin, manufacture and transport was all a matter of coal supply.

In 1916 and 1917 the submarines of the Central Powers placed Britain in a dangerous position, and the cry was then for ships, and more ships. Ships again are but an outgrowth of coal production.

The submarine brought England to a dangerous pass through food shortage, but this shortage did not arise from any real failure of food supplies throughout the Empire, but was caused by the shortage of freighting steamers. Ships cannot be built, nor can they cross the seas without coal.

Recently the question of man-power has been apparently paramount. But what is the use of large bodies of soldiers, and great reserves of man-power, if they cannot be mobilized, fed, trained, armed and sent to the field of battle. And yet none of these things can be accomplished without coal.

Coal and iron have been lodestones to the Germans throughout the war. Iron is useless without coal to smelt it, so the matter resolves itself again into a question of coal supply. Why did the Germans venture their slim expeditions into the Don Cossack country and push their way to Ekaterinslav? Because there are to be found valuable deposits of anthracite. Why did they desire the district around Lodz in Poland? What did they seek in Belgium, and in France north of the Somme? What do they lust after yet in that part of Holland which borders on the Campine coalfield? Coal supply, because they know its value as no other nation knows it.

The general public is not aware of the straits to which France was reduced by the Germans gains made this spring in the northern coalfields of France, nor how greatly these gains increased the strain upon the transportation facilities of England. What is the overpowering, crying need of the Scandinavian countries, of Holland and Spain? Not wheat or food, but coal. The greatest lever that yet remains to Germany in her dealings with the small neutrals that surround her is her ability to give them a coal supply. Italy, Greece, the whole Mediterranean littoral, is dependent on Britain and America for coal. Britain's effort has been stupendous. The effort of the United States is already great, and will probably reach unexampled dimensions, but it is doubtful if any but the smallest percentage of the citizens of Britain or America realize the part that coal has played, any more than they realize the limitations that will be imposed on these efforts if coal is not forthcoming in the necessary quantities.

Is it too much then to say that the production of coal is not an industrial matter, but a department of national defence?

A great deal has been said and written about the suffering which may result in North America from a coal shortage among the civilian population, and properly so, but if the coal output should prove insufficient for the requirements of the armies and the navies of the Allies, the needs of the civilian will receive scant consideration. He may, indeed, freeze to death, and he will be allowed to freeze to death, before the Allied Governments will allow the movement and the munitionment of their armies to be imperilled.

It is about time that responsible people ceased to talk about the hours worked by the miners, or to worry about the supposedly high wages he is earning, or the supposedly high selling prices received by the coal operators, and got down to a realization of the fact that the coal production has been reduced **exactly in proportion to the miners who have enlisted**, and that it can only be restored by bringing back the men who have gone, or such of them as are left alive.

In face of these facts, it is stated that the citizens of Winnipeg are still debating whether they can stand the annoyance of using soft coal mined in Canadian collieries in place of anthracite imported from the United States. When it is considered that practically nothing but soft coal is used in Nova Scotia, and that anthracite is unknown in Britain and Europe as a domestic fuel, the attitude of the Winnipeg people is amusing, in August, but it will be a tragic recollection next January.

The production of coal in Nova Scotia is two and a half million tons per annum below pre-war figures. The production of coal in the Canadian West has increased, but it also is still far below pre-war figures, and also, like Nova Scotia, far below the capacity of the existing collieries. There are said to be collieries in the Canadian West that are not working full time because of lack of outlet. This is not the case in Nova Scotia. There the coal shortage is altogether a matter of labor. There is market and to spare, for Nova Scotia used to send two million tons of coal per year to Montreal, but for several years the Province has exported little or none at all to St. Lawrence ports. If there is any Canadian colliery that is not working every day to the full capacity of the men that are left to work in it, this is a question that demands the immediate attention of the Government. Questions of cost and trans-

portation are of secondary, and even negligible importance to-day where coal supply is concerned. All previous ideas of economics and trade channels should be scrapped in this matter if they interfere or lessen coal production. Everything, price, wages, transportation costs, convenience, vested interests, custom and precedent should give way to the paramount necessity of increasing the available supply of the most important munition of war.

It is a sample of our topsy-turvy conceptions of war needs that we have Ministers of Blockade, Ministers of Propaganda, Ministers of Munitions, of Shipping; and Bureaus and Departments without number, but the creation of a responsible Minister of Mines with some real powers has not occurred either to Canada, the United States or Great Britain. Neither does there appear to have been in the legislatures of any of the Allies men with scientific and mining knowledge sufficient to place the question of coal supply before our Governments in its true importance. There was really no need, had such representations been made and heeded, for the decline in coal production that has actually taken place, for the number of men employed in the coal mining industry—particularly those men employed at actual coal digging—is numerically small compared with the all important influence of coal supply on all other industries, and the retention of these men in the collieries would have been of greater advantage from a military standpoint than the advantage gained by their enlistment.

In making this statement the writer does not wish to be understood as belittling the value of the miner as a soldier. He makes the very best of soldiers, and the armies are glad to get the miner, because he is fitted by his training and his inherited physique for the arduous calling of the soldier. All this is well known and admitted, and yet the coal miner cannot be more advantageously employed, if the winning of the war is desired, than in mining coal.

Canadian territory has not been invaded, or even threatened. Our man-power has not been called to the ranks in anything like the proportion of French and English experience, and yet our coal production has shown proportionately the most disappointing decline of any part of the Empire. This is not as it should be, and it is not a pleasant thing to contemplate.

PLANNING FOR MORE COAL.

The Wall Street Journal says: The fuel administration has adopted a plan whereby it hopes for a material increase in coal production. Briefly, this comprehends a director of production; under him, 28 production managers, one for each coal-producing district. These managers will have charge of production committees formed for most of bituminous mines, committees of six being divided equally between representatives of mines and operators. Each committee is to look after production of its own mine, locate blame for a weekly production less than maximum and report to the local production manager.

As our coal requirements now run about 80,000,000 tons ahead of normal output, every possible means of increasing the supply should be employed. Not a gun or a shell can be made without coal. Manufacture and transportation of everything going to make up and maintain an army depend upon coal.

But however good this plan may be, it seems as if there is room for improvement. There would be no need of any further suggestions if every miner were aroused to the issues of the war. Many are. There

are men of intelligence and good education mining coal to-day. One of the most eloquent orators of the Methodist Episcopal church, now a bishop, was once a Pennsylvania coal miner. John Mitchell was a coal miner. One member of President Wilson's Cabinet worked for years with pick and shovel in the Pennsylvania coal mines. There are many more such laboring now in the mines of the United States.

But, likewise, there are many more that could not tell whether the United States is governed by a king or president. They do not speak the language of the United States. They do not know what liberty or self-government means, and perhaps do not care. America represents to them a place where they can get more pay for a day's work. The war means nothing to them.

We talk about the melting pot. Yet we have never done anything but fill it to overflowing. We expected the material to fuse without any fire beneath the pot. Now is the time to melt this material. It is being done in other callings.

OPENING GRANBY COLLIERY NO. 1 ON VANCOUVER ISLAND, B.C.

Under this heading the Granby News recently published information relative to the Granby Consolidated Co.'s coal-mining property and operations at Cassidy, Vancouver Island, British Columbia, as follows:

"Cassidy, Vancouver Island, is the latest instance in British Columbia of a community being built along modern and progressive lines, and while the development is ultimately to serve the ends of production, at the same time benefit accrues to both the individual and the company. Cassidy is not what might be termed a 'war town,' that is, a community where some munition or other war necessity is being manufactured or produced, and which, when this present and urgent demand shall fall off, may have a decline in both activity and population. On the contrary, while industrial necessity is the prime cause of its establishment, its activity promises to steadily increase, and the work being carried out there assures it a prosperity for the present and an augmentation of prosperity in the future. For at Cassidy the Granby Consolidated Mining, Smelting, & Power Co. is mining coal, the first object of which is to supply material for the manufacture of coke for the company's big copper smelter at Anyox. Incidentally, what surplus coal shall be available will be disposed of in the general market. Already shipments have been made for storage in bunkers at Ladysmith harbor, so that an adequate supply will be available when the coke-manufacturing plant at Anyox shall be ready to receive it. Work on the coke and by-products plants is being rushed, but it will be some time yet before the company will be producing coke for its own purposes.

"Six months ago the site at Cassidy was the usual British Columbia timbered ground. To-day, from an area of 85 acres the timber has been removed, stumps as well, various industrial and residential buildings have been erected or are in course of construction; a circular radial brick chimney 125 ft. high has been erected by the Custodis Chimney Company of New York, and coal is being mined at the rate of 100 tons a day. About 1,250,000 ft. of timber was taken off the property and this is being cut by the company's saw-mill, which has a capacity of about 20,000 ft. a day, 750,000 ft. having been cut to date. To meet building requirements, 2,500,000 ft. of lumber has been purchased from Vancouver Island lumber companies, prin-

cipally from the Victoria Lumber and Manufacturing Company at Chemainus, the Ladysmith Lumber Company, and the Frank Beban Lumber Company, all operating in the district.

"As soon as clearing had been sufficiently advanced, the sinking of three slopes—a main hoisting slope, a return airway, and a travelling way—to cut the coal, was commenced. Sinking operations on the main hoisting slope and the return air way were begun, working one shift, on March 7, 1918, and the material was excavated by the open-cut method up to March 15, when three 8-hour shifts were started and the first car of sand and gravel hoisted.

"The drift material which overlies the coal measures at the point where the three slopes are sunk is a delta deposit and is known geologically as the Colwood sands and gravel, and which in this coal area attain a maximum thickness as great as 200 or 250 feet. The character of the deposit at this point is a free running sand, with absolutely no cementation whatever, which makes it a very difficult ground to handle. It became necessary from the commencement of sinking operations to use forepoling or piling which were driven skin to skin ahead of the face on the top, bottom, and sides, with a heavy battering ram, and the face of slope also had to be breast-boarded closely to prevent the loose sand running in at that point. Water was encountered at a depth of 15 ft. below the surface where the coarser sands gradually gave place to finer until at a depth of 2 ft. the material was a fine quicksand. From this point until the coal measures were reached a special type of spiling was used. This consisting of 4 by 6 in. fir lumber, grooved and tongued, to make a perfectly tight joint. The special spiling was necessary to prevent the inflow of sand which ran through between the joints of the ordinary 4 by 6 in. spiling when driven skin to skin. With this groove and tongue spiling and considerable quantities of horsemanure, the faces were kept open until the permanent sets of timber were placed. Sinking through ground of this nature is exceedingly slow and difficult, and at times 18 in. in 24 hours was considered a good rate of advance.

"The main hoisting slope was sunk a distance of 145 ft., through gravel and quicksand, at which depth the coal seam was encountered, and the first car of coal was hoisted on June 29. This, however, was not the first coal hoisted from the mine; that occurred on April 20, when coal was taken from the travelling slope or manway.

"The sinking of the travelling slope was not nearly so difficult as that of the two other openings, as there the sand contained very little water. Sinking of this slope was commenced on April 3, and the top of the coal seam was encountered on April 29 at a distance of 95 ft. from the portal.

"Coal is being mined from what is known as the Douglas seam, one of three seams of high-grade bituminous coal existent on Vancouver Island, the two others being the Newcastle and Wellington seams. The company has 800 acres of this coal land, with a 10-ft. seam, assuring a supply which will last for many years. While the present output is but 100 tons a day, this is only of coal being taken out in the course of development and getting the mine ready for an ultimate production of 1,000 tons a day of 8 hours.

"Transportation facilities are very convenient. Cassidy is situated on the Esquimalt & Nanaimo railway, which runs from Victoria through Nanaimo to Courtenay and Port Alberni, while a spur provides connection with the Granby Co.'s colliery.

"To produce 1,000 tons of coal per shift, 500 or more men will be employed. Hygienic arrangements for this number of men will be as perfect as modern methods will permit. The change-house, supplied with hot and cold water, showers, baths, etc., is situated conveniently to the three slopes mentioned, these being but a short distance from and parallel to each other. Right at hand, too, will be the mine-rescue station, mine office, and supply house. These essential surface buildings have been arranged as a result of practical experience and it is expected they will tend to the utmost efficiency.

"The rooming-house, a two-story fireproof building, will give to the single men accommodation unexcelled by any building of its kind. It will be 100 by 140 ft., built in the shape of a double L, with 76 rooms, all opening to the outside. Each room will have hot and cold water and, in short, every convenience common to the ordinary household. The mess-house, 75 by 125 ft., will be situated handily, and in this, too, practical experience has been turned to account, so that construction and facilities are to the end of best service.

"For the employees who have families, dwellings are being erected. These are of no fixed design, but the style of architecture is the same as may be seen in the newer parts of Vancouver and Victoria. The houses are handsome in appearance and contain every convenience, such as hot and cold water, bath, cooling chamber in connection with pantry, electric light, etc. These dwellings range in size from three to eight and ten rooms, their cost ranging from \$2,500 to \$7,000 each.

"Water for domestic purposes is obtained from the Nanaimo river, which runs near by, the water being pumped from a filter basin to storage in tanks on an elevation which gives a gravity pressure of 65 lb. Sewage disposal is by means of septic tanks, the soil being admirably adapted for this purpose, being light with much gravel.

"One of the striking industrial features on the surface is the radial brick chimney, which the Custodis Company erected in the very short period of 12 days. At its base the boiler and power-house are being built. The boiler-house will contain two 350 h.p. water-tube Stirling type boilers made by the Babenhausen Company and fitted with automatic stokers. The equipment of the power-house will consist of two direct-connected generators, one of 400 and the other of 250 kw. capacity; a cross-compound compressor, capacity 2,500 ft. of free air per min.; and pumps for fire protection, etc. Electric energy from this power-house will drive the various units about the mine, including a fan of 150,000 cu. ft. capacity, machine-shop, carpenter-shop, tipple, mine-haulage, pumping and lighting for the industrial part of the plant and for the dwellings.

"The carpenter, machine, and blacksmith shops are situated convenient to the top of the slopes. Here will be constructed the mine cars in which coal will be hauled from the mine up the hoist slope, proceeding thence by gravity to a chain haul which will elevate them to the tipple into which the coal will be dumped for cleaning and classifying and then loading into railway cars.

"In charge as superintendent is Mr. Geo. L. Fraser, whose experience in connection with coal-mining has been extensive and varied. He is an old Granby Company employee, well known in both Boundary and Anyox districts. Assisting him is Mr. J. W. Powell, mine manager. To both these men credit is due for their cordial assistance in presenting these facts concerning the colliery at Cassidy to their associates in the employ of the Granby Company."

CANADA'S PRODUCTION OF MUNITIONS OF WAR.

The following figures give a summary of Canada's accomplishments, during the last four years, in the production of munitions of war:

Total number of shells produced	60,000,000
Approximate number of components represented by above, for which Imperial Munitions Board has let separate contracts	670,000,000
In addition to the 60,000,000 of shell produced, there have been a great number of components exported, such as forgings, cartridge cases, primers, copper bands, time and graze fuses, exploder containers, friction tubes, etc. In the production of this war material steel has been used to the amount of	1,800,000 tons
(About 75% of this steel is Canadian product.)	
Quantity of high-grade explosives and propellants produced	100,000,000 lb.
Value of orders placed by the British Government through the Imperial Munitions Board	\$1,200,000,000
Amount of orders already executed ... (This figure represents the actual amount of cash disbursements.)	\$1,000,000,000
Amount furnished by Imperial Government for above purpose from sources outside of Canada	\$400,000,000
Amount loaned to the Imperial Government by the Government of Canada and by the Banks in Canada for purposes of the Imperial Munitions Board	\$600,000,000
Approximate number of contractors in Canada amongst whom contracts for munitions have been distributed ...	1,000
Number of workers engaged in war contracts	200,000-300,000
Approximate number of persons employed in handling stores in transportation and other collateral organizations	50,000
Approximate total number of workers	350,000

The following is a brief sketch of the growth of the munitions industry in Canada:

Shortly after the outbreak of war, inquiries were made of the Department of Militia and Defence by the War Office as to the possibility of obtaining a supply of shell from Canada. Ensuing negotiations led to the appointment by the Minister of Militia, in September, 1914, of an honorary committee, known as the Shell Committee, to undertake the task of supplying shrapnel shell to the Imperial Government. Its status was nominally that of contractor to the British Government, but really that of agent for the purpose of placing contracts on behalf of the War Office.

Basic steel, the only kind of steel made in Canada, was found by experiment to be suitable for the manufacture of shells. The first shipments of shell from Canada, in fulfilment of the orders placed by the Shell Committee, were made in the month of December, 1914—a little over three months from the inception of the undertaking. By the end of May, 1915, approximately four hundred manufacturing establish-

ments in Canada were engaged in the manufacture of shells or the component parts thereof.

By November, 1915, the Imperial Government had placed orders in Canada for munitions to the amount of, approximately, \$300,000,000. This represented such a great volume of business that it was considered desirable to form a Board directly responsible to the Imperial Ministry of Munitions. The operations of the Shell Committee, therefore, were passed over to the Imperial Munitions Board. The general policy of the Committee, maintained by the Board, was that of eliminating the middleman and dealing as far as possible with those who would actually perform the work. In pursuance of this policy raw materials of every description were purchased and passed on from contractor to another, each being paid successively for his labor. This plan had the advantage of saving the contractor large investments of capital otherwise necessary to produce complete shell, and at the same time of enabling a proper distribution of the materials available so that the maximum production might be secured. Contractors were given the opportunity to pay for their necessary investment of capital from the profits derived from their contracts. Generally speaking, this has been accomplished. Subsequently the business was placed upon a competitive basis.

The work of the Board is carried on by the Chairman, who has full administrative and executive authority. He is assisted by a Board, of whom four members give constant service. Business men have been asked to take charge of the various departments, numbering about twenty. These Directors carry on their duties in Ottawa, in Toronto, in Vancouver, and in Victoria. The following are details regarding the most important of these departments:

1. The Purchasing and Steel Department buys all the materials entering into munitions, arranges for the forging of steel, and distributes the forgings and components to the machining plants situated in the various Provinces.

2. The Shipbuilding Department purchases and supervises the construction of engines and boilers for the wooden ships referred to below, purchases the timber and supplies for the hulls, and has an operating section which installs the engines, boilers, and equipment in these vessels.

3. The Explosives Department operates the National plants producing nitrocellulose, cordite and T.N.T., with the necessary acid plants, and operates the plant producing acetone and methyl-ethylketone.

4. The Forging Department operates the National plant in which the steel turnings are melted in electric furnaces, and the steel thus produced subsequently converted into forgings.

5. The Aviation Department operates the plant producing aeroplanes, and in its constructional section builds all aerodromes, machine shops, barracks and officers' quarters at the various camps, and purchases all supplies and equipment for the Royal Air Force.

6. The Timber Section producing aeroplane spruce and fir, conducts logging operations in British Columbia, and operates tugs for the delivery of logs to mills which cut them for account of the Board, under supervision of the Board's officer. These logging operations call for the production of 248,000,000 feet of logs in 45 camps placed in a territory extending over 600 miles, north and south.

7. The Fuse Department operates the National plant where time fuses are loaded.

8. The Engineering Department checks and rectifies all gauges, keeping for this purpose a staff of engineers and an operating force of expert tool-makers working in machine shops under their direction.

9. The Inspection is all carried out under the Director of Inspection, a British officer, responsible to the Director-General of Inspection in Great Britain. Several thousands of inspectors are required to do the work.

10. The administrative staff comprises from 1,000 to 1,500 men and women, the number varying with the degree of urgency.

The operations of the Board have gradually been extended into lines of war material other than steel, and the Imperial Munitions Board is now endeavoring to explore and make available for war purposes those natural resources of the country hitherto undeveloped. The forests of Northern British Columbia have been called upon to provide spruce for aeroplane purposes and for wooden shipbuilding. To a lesser extent the timber resources of Ontario, Quebec, and New Brunswick, have been drawn upon for the same purposes. The mines of British Columbia are producing copper, zinc and lead. The Province of Quebec is supplying asbestos, aluminum, carbide, and other mineral products in large quantities. Ontario is providing nickel, silica, and carbides, and in collaboration with the Canadian Department of Mines there has been an extensive production of alloys to be used in the manufacture of high-speed tool-cutting steel.

The development of the explosive and propellant industry in Canada has been an important achievement. It has been the policy of the Board to establish National plants for the purpose of stimulating any important line of production which private enterprise was unwilling or unable to carry on, and at the present time seven of these plants, representing a capital investment of \$15,000,000, are being operated under the immediate direction of the Board. The two largest manufacture explosives, and these, with privately owned plants, have produced up to June 30th upwards of 100,000,000 pounds of high-grade explosives and propellants.

The Shipbuilding contracts placed by the Board have a value of some \$70,000,000. These represent 43 steel ships and 58 wooden ships aggregating 360,000 tons. These contracts are distributed by value as follows:

To British Columbia \$35,000,000; Ontario \$20,000,000; Quebec, \$12,000,000, and to Nova Scotia and New Brunswick the balance.

One National plant is devoted to the manufacture of aeroplanes for training purposes (over 2,500 of which have already been produced), and latterly to the construction of bombing planes for the United States Navy. Aeroplane engines of high-grade are now being manufactured, and will shortly be produced in large quantities for use in fighting machines at the front.

The Board acts as general and exclusive purchasing agent on behalf of the War Office and Admiralty, and the British Timber Controller, Department of Aeronautics, and Ministry of Munitions. In addition, it acts as agent for the United States Ordnance Department in arranging contracts for munitions and supplies, placed by the United States Government in Canada. At the present time American contracts amount to upwards of \$70,000,000, and orders are coming forward in rapidly increasing quantities.

In the report issued by the Imperial War Cabinet for the year 1917, Canada's services to the Empire in the production of munitions are referred to as follows:

"Canada's contribution during the last year had been very striking. 15 per cent of the total expenditure of the Ministry of Munitions in the last six months of the year was incurred in that country. She has manufactured nearly every type of shell, from the 18-pr. to the 9.2 in. In the case of the 18-pr., no less than 55 per cent of the output of shrapnel shells in the last six months came from Canada, and most of these were complete rounds of ammunition which went direct to France. Canada also contributed 42 per cent to the total 4.5 shells, 27 per cent of the 6 in. shells, 20 per cent of the 60-pr. H.E. shells, 15 per cent of the 8 in. and 16 per cent of the 9.2 in. In addition, Canada has supplied shell forgings, ammunition components, propellants, acetone, T.N.T., aluminum, nickel, nickel matte, aeroplane parts, agricultural machinery and timber, besides quantities of railway materials, including no less than 40 miles of rails torn up from Canadian railways which were shipped direct to France."

ORES USED FOR MANUFACTURE OF SULPHURIC ACID.

For the production of all the grades of sulphuric acid in the United States in 1917 the following quantities and kinds of ore were used:—

	Sulphur.	Pyrites.	Gold and Silver bearing pyrites & galena.	Copper-bearing sulphides.	Zinc-bearing sulphides.
Domestic . . .	463,364	376,955	17,380	708,502	584,100
Foreign . . .	20,463	880,183	.....	147,531	152,811
	483,827	1,257,138	17,380	856,033	736,911

In the column headed "Pyrites" are tabulated all the sulphide ores used that are not treated further for their copper, lead, zinc, gold, or silver content. Much of this material doubtless contains small quantities of these metals, but inasmuch as they are not recovered, their presence in the ore is of no economic importance.

A comparison of the different kinds of ore used in 1917 and in 1916 shows that over 210,000 long tons more sulphur, 90,000 tons more copper-bearing sulphides, and 110,000 tons more zinc-bearing sulphides, but 220,000 tons less pyrites were used in 1917.

PUMPING SANDS FROM COBALT LAKE.

Everything is in readiness at the plant of the Mining Corporation of Canada to commence pumping sands and slimes from the bed of Cobalt Lake. The operation is perhaps the largest of the kind ever undertaken in Canada. Upwards of half a million tons of sands and slimes from past operations have accumulated in the bed of Cobalt Lake. The material contains several ounces of silver to the ton, and with silver at \$1 an ounce the value of the whole is large.

The pumping equipment is the most powerful in Cobalt. It consists of two eight-inch pumps one driven with a 100 h.p. motor and the other by a 125 h.p. motor. The capacity of these pumps is estimated at from 1,000 to 1,200 tons of sands and slimes every twenty-four hours.

Changes already completed in the mill will allow of the treating of about three hundred tons daily. This will be gradually increased until a capacity of about 650 or 700 tons daily is reached.—The Mining Review.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Good Progress at the Patricia Gold Mine.

From a raw prospect to a producing mine in less than nine months is a record that any mining property might well be proud of. This is the actual accomplishment at the Patricia Syndicate property in the Boston Creek District. Before being taken over by Mr. Charles O'Connell and Montreal interests, the property was known as the Boston Hollinger. Since the latter time the company has installed a 40-ton mill and partially developed the property to a depth of 200 feet. Two shipments of gold bullion have been made and a third one is expected to be sent out in a short time.

The new mill is one of the most compact and efficient of its kind in the north. The ore is first crushed to a three-inch ring and fed to a ball mill, where it is ground to the desired fineness. It then passes over the primary plates where about 72 per cent. of the gold content is recovered. After passing over the primary plates it is classified, the oversize going back through the mill while the remainder passes down over the concentrating tables. A total recovery of from 92 to 94 per cent. is obtained by this process. This is made possible by the free-milling character of the ore dealt with.

The grade of ore being encountered at the mine is very high and mill heads of from \$20 to \$22 per ton are considered very ordinary, while assays often run several hundred dollars to the ton. Taken as a whole, the general run is perhaps the highest of any producing mine in the Dominion.

The main vein has been developed to a depth of 200 feet, at which point the average values show a considerable increase over that obtaining at the 100 ft. level. For the entire distance the vein will average about two feet, while at places it widens out to as much as four feet. The vein matter is a bluish quartz, heavily mineralized and containing spectacular quantities of free gold, while the general run of the ore is decidedly free milling.

Miller-Independence Discovery is Important.

During the past few weeks one of the most important developments in the mining industry in the north country has taken place at the Miller-Independence mine in the Boston Creek district. The discovery of a rich vein on the north side of the property with a southerly dip for the first 70 ft. at an angle of 55 degrees and later straightening up to about 62 degrees, and ranging in width from 9 to 12 ft., has given this property a place of prominence, and has added greatly to the general interest and activity of the district. The new shaft being sunk on this vein has now reached a depth of 175 ft., at which point phenomenally rich gold tellurides are in evidence. The tellurides contain approximately 42 per cent. gold.

The Miller-Independence was purchased three years ago by Mr. George Miller and a number of American associates, since which time something like \$300,000 has been spent on the property, including the purchase price. Until the present summer, efforts were centred on the development of a high grade vein, which at times looked like a winner; but this deposit was found to lack the requisite consistency of a profitable producer. A new vein or outcropping was found early this summer by Mr. W. R. Adams, mill superintendent, who was constantly making a study of the geology

of the property. It is a remarkable fact that the discovery was made at a point where the main road crosses the property.

It is proposed to continue the main shaft to a depth of 200 ft., and drive drifts both east and west as was done at the 100 ft. level. This will give four faces in ore to provide feed for the forty ton mill, which is being made ready for operation. A number of additions are being made to both the milling and mining equipment.

The Renaud group of claims, lying adjacent to and south of the Miller-Independence at Boston Creek, was last week reported as taken over by Mr. Robert Norrington, representing Detroit interests. The deal is understood to be still pending. The purchase price is said to run up in six figures and is the first big deal since the recent rich discovery on the Miller-Independence. Exploration work is to be commenced at once, provided no serious hitch occurs. Mr. S. Renaud, who is in charge of the work, is one of the original owners of the property, along with Mr. A. Cullen, both of Haileybury. The trend of the large vein on the Miller-Independence is north of east and it should pass across the southwest part of the Renaud group. Several other veins have been opened up on these claims and in a number of them gold has been found to occur. The geology on the Renaud group is very similar to that of the Miller-Independence.

Electric Power for Boston Creek.

The Northern Ontario Light and Power Company has entered the Boston Creek field. Arrangements are being made for supplying the Patricia Syndicate and Miller-Independence with electric power. The transmission line of the power company supplying the Kirkland Lake mines passes through the Boston Creek field. It will be a comparatively simple matter to connect up with the operating mines of the new camp. The new switch tower has already been completed.

Improving Transportation Facilities at Boston Creek.

A new station is being erected at Boston Creek and a telegraph and ticket office together with a baggage room will be enclosed in a building forty feet in length. In the meantime two freight cars are being used to serve the purpose of a station. A new site has been chosen where the ground is more level than the previous station site and already a number of merchants are moving their places of business to the new location. The roadway leading to the Miller-Independence and Patricia property as well as other promising claims in the district, is fast being put in shape, and the camp is showing signs of general activity.

Developing Lightning River Claims.

Samples taken at a depth of twenty feet on the vein at the Howie-Couchenour Williams claims in the Lightning River district is said to have resulted in commercial gold values being shown. The vein is two feet in width and well mineralized, while the wall rock from one to two feet on either side of the vein carries commercial values. The fact that from four to five feet of ore has been developed by the limited amount of work done, would appear to hold out considerable encouragement for other property holders in the neighborhood. More or less removed from railways and good roads, the opening up of the Lightning River area is necessarily slow. However, should present good results continue to attend the development of properties, it is highly probable a remedy will be found for the present unfavorable transportation facilities.

Encouraging Results in Skead Township.

Late advices from the Skead township gold area are

of a very encouraging nature. Samples taken from the Crawford claims which adjoin the Costello group, show spectacular quantities of free gold. It is also said that mineral having the appearance of tellurides has been found in the vein, which is composed of highly mineralized quartz and red porphyry. The vein is from five to six feet wide.

Work is also being done on the Fidelity property here and the results are said to be proving very encouraging, with the result that the development plans will be still further enlarged. On the property of the Wisconsin Skead Development Company work has not been resumed as yet. On the Martin group nearby, satisfactory results are being met with. The recent discovery on the Crawford claims, taken together with that of the Cook-Myles group and strengthened by the finding of calaverite on the Miller-Independence, less than ten miles to the west, all tend to lend considerable importance to the trend of developments in the Skead township gold area.

Nipissing Production Continues Large.

According to the monthly report of the Nipissing Mining Company, ore to the value of \$304,694 was mined during the month of July, and bullion and residue of an estimated net value of \$877,231 was shipped. Underground operations continued to be of the usual nature and extent. Several new small veins of low assay were encountered in shaft No. 73. The high grade mill treated 172 tons and shipped 842,870 fine ounces of silver. The low grade mill treated 7,058 tons. The following is an estimate of production for the month of July:

Washing plant	\$118,243
Low grade mill	186,451

Total \$304,694

For the month of July, 1917, the company's production amounted to \$272,490. The total production for the year 1917 amounted to \$3,358,972; while for the first seven months of the current year the production of the property has amounted to \$2,223,928.

Kerr Lake's Banner Year.

During the month of July the Kerr Lake Mining company produced approximately 231,000 ounces of silver. This compares with a corresponding output of 189,392 ounces for the corresponding month of the previous year. With the exception of the month of May, which was the highest in the history of the company, July shows the highest production for the current fiscal year which ends August 31st. The current year is expected to prove the banner year in the company's operations. For the eleven months just ended the output amounted to 2,364,122 oz. Provided the output equals that of July the total production for the current fiscal year will equal over 2,595,000 ounces of silver. The production for the past eleven months in detail has been as follows:

Month.	Ounces.
September	210,398
October	213,802
November	205,522
December	203,400
January	204,641
March	207,100
April	201,000
May	268,213
June	210,000
July	231,000

Total 2,364,122

The strong financial position of the company has led to various reports regarding the likelihood of an extra disbursement of the funds of the company being made with the next regular dividend.

Developing Indian Peninsula Molybdenite Mine.

Work on the Indian Peninsula property in the Hurricanaw river district which was recently purchased by the Penn-Canadian Mining Company of Cobalt, is making satisfactory progress. About three carloads of material for the new mill and a number of horses were shipped to the property last week. Every effort is being made to commence the production of molybdenite at the earliest date possible.

Nipissing Tramway Again in Operation.

The aerial tramway of the Nipissing Mining company which was used for conveying ore from the Meyer and Fourth of July shafts on the west side of Cobalt Lake, was put out of commission during a recent fire in Cobalt and took several days to repair. It is again in good working order.

Nipissing in Matachewan Area.

The Nipissing Mining Company has purchased the outfit being used by the Mining Corporation of Canada in the exploration of a group of claims which they had under option in the Fort Matachewan district. The Nipissing will use the machinery for the exploration of a property adjoining the Otisse.

Shipping Ore from Foster Property.

Ore is being shipped from the old Foster mine dump, by the interests which recently acquired control of it. It is planned to ship ore at the rate of about twenty-five tons per day for the first week. This will gradually be increased to between fifty and seventy-five tons per day. Teams will be used for hauling the ore to the railway. It is understood the ore will be treated at one of the local customs mills.

Developing Cochrane Mine from the Temiskaming.

The Temiskaming Mining Company has taken an option on the old Cochrane property, and already work has been extended onto the latter property from the lower ground workings of the Temiskaming. The operations on the Cochrane will be carried on under most favorable conditions, with the aid of the Temiskaming's powerful mining machinery. Under the terms of the agreement the Temiskaming is obliged to spend a minimum of \$1,000 per month in the development of the property. Development work on the Cochrane has been carried to a depth of 500 ft., the last operators of the property being the Crown Reserve Mining Company. The main vein is one of the strongest in the camp, but silver values have so far proven very erratic.

Keeley Mine Sold.

The old Keeley Mine in South Lorrain has been purchased for \$100,000 by the Goldfields Consolidated Mining Company of West Australia, which is an English concern. The property is now being worked with considerable vigor, operations being under the supervision of Mr. H. Black, formerly of the Porcupine V. N. T. property. The English interests decided on the re-opening of the property following an inspection of the property by Dr. J. McIntosh Bell early in the summer. Several tons of ore shipped from the property were said to contain from one to two thousand ounces of silver to the ton. Already a vein has been opened up on the first, or 60 ft. level, which is about five inches in width and is said to be the old No. 8 vein. This vein in places carries ore as high grade as 2,000 ounces to the ton. Owing to the results obtaining on the Keeley and in the South Lorrain section generally, increasing activity is evident.

Gold from Northern Ontario



This specimen, shown actual size, is from the Atlas Property, MacMurchy township, Sudbury Mining Division.

The specimen has been cut and polished, and the polished surfaces are shown above. The lower view is of the natural rough surface.

An Opportunity for Prospectors

The mineral wealth of Northern Ontario is enormous. From a few developed areas a very large output of nickel, copper, silver and gold is being made. Many promising areas are awaiting the prospector and miner.

One of the greatest factors in development of mineral areas is the provision of transportation facilities. Railways and the mining industry have together played a very important part in the development of Northern Ontario.

The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

The gold specimen shown on the other side of this page is from MacMurchy township, an area most easily reached from the new line of the Canadian Northern Railway. Discoveries of other metals, including iron, copper and zinc, have been reported from points served by the Canadian Northern.

THE DEPARTMENT OF RESOURCES CANADIAN NORTHERN RAILWAY

The Department of Resources, Canadian Northern Railway Building, Toronto, will be pleased to furnish information about the districts served.

Chambers-Ferland.

The old number two shaft of the Chambers-Ferland mine of the Aladdin-Cobalt mining company has been pumped out, but without revealing any ore. The early work done in this shaft was accomplished in the early days of the Cobalt camp and no records of the work had been kept.

Adanac.

As the north drift of the Adanac continues at the 310 ft. level, the vein is maintaining a width of several inches and the mineralization is increasing. Considerable cobalt ore and nicolite is present in the vein and the outlook is considered very promising. In the meantime the crosscut to the east is being pushed ahead, through ground the geology of which is considered highly favorable for the occurrence of commercial ore. The Adanac is one of the newer operations of the camp and is considered to have good chances for developing into a mine. The aggressiveness of the management and directors of the company in their efforts to locate ore bodies are highly commendable. The work being carried out is on the advice of Mr. Alfred R. Whitman, geologist, and to date has proven up to his general expectations.

Doherty Claims May be Recorded at Haileybury.

A rearrangement of the boundaries of the Temiskaming Mining division took place recently and the new area which is now known as the Doherty district has been included in the aforementioned division with the recording office at Haileybury. This new order went into effect on the first of August and was hailed by mining men and prospectors interested in the Doherty district with much satisfaction. The change removes the necessity of delay and inconvenience in the recording of work in Toronto which was hitherto the case.

Buffalo Reduces Capitalization.

The Buffalo mining company of Cobalt decided at a recent meeting on the reduction of the capitalization of the company by another quarter of a million dollars. Originally the capitalization was one million dollars. In 1917 it was reduced from one million to three quarters of a million dollars, while the present reduction just decided on will leave the capitalization of the company at half a million dollars. Up to the end of 1916 the company had reimbursed the shareholders to the extent of \$2,787,000, and with the two payments made since that date the total returned to the shareholders amounts to \$3,287,000.

The company is treating a number of old dumps which contain ore of low grade, while a considerable tonnage of good grade mill ore is coming from the underground workings of the mine. The huge sand pile is also being treated in the oil flotation plant. A considerable profit is being made in the treatment of this material.

New Vein on Hudson Bay Yields High Grade Ore.

The new vein, containing about four inches in width of high grade silver, discovered last month on the old Hudson Bay property, while cleaning up some old workings of the mine, is yielding quite a large amount of high grade ore. The vein is running in the direction of the Trethewey boundary. The more or less accidental discovery of such a vein may be taken as conclusive evidence of the big possibilities of opening up new high grade veins in other mines of the camp during the course of mining the present known ore reserves, and thus adding materially to the value of the properties.

\$1,500,000 in July.

During the month of July the Cobalt mines shipped approximately three million pounds of silver ore; and during the same period upwards of a million ounces of bullion. With the price of silver at one dollar an ounce the value of the refined silver shipped was approximately one million dollars, while it is conservatively estimated that the three million pounds of ore shipped contained another half million ounces of the white metal. Thus the production of the camp is running at the rate of about \$1,500,000 per month, or eighteen million dollars per annum. The year 1918 bids fair to surpass the previous high record in point of value, which was that of 1912.

High Costs of Production is Closing Down Gold Mines.

In the Porcupine Camp operations being carried on at the McIntyre Porcupine Mine, the Hollinger and the Dome Lake Mines, as well as the Davidson, is resulting in a very material gold output. At the first two mentioned properties the output is being maintained at a rate sufficient to pay dividends at more or less regular intervals, and in all probability this will continue to be the policy of these two companies. However, at the Schumacher, Porcupine Crown, Porcupine V. N. T., and the Dome mines (with the exception of the development under way on this property at the 1,250 ft. level), operations have been suspended, and while the physical condition of the various properties is generally known to be better than at any previous time in their history, the economic conditions make the suspension of operations the most profitable policy. How long this condition will persist is a matter of much conjecture, but in all probability it will continue until the economic pressure is relieved by the cessation of hostilities in Europe. In the meantime the ore reserves of the various mines in which operations have been suspended are not depreciating in value, and will be available when the war is over.

Diamond Drilling at Ankerite.

An extensive diamond drilling campaign is being planned for the exploration of the Ankerite property at depth. Two large parallel ore bodies are in evidence on the Ankerite, which lies a mile or so south from the Dome Mines, Porcupine.

Cotter Property Sold.

According to late advice, the Cotter property has been purchased by interests identified with the Bourk's Mines, at Bourk's Siding. The principals are Toronto men. For a time it was feared difficulties were taking form, in that although the deal was supposed to have gone through last week, a hitch occurred which held up its successful consummation until this week. The Cotter property lies east from the Miller Independence, in Boston Creek.

Encouraging Results at Savage Mine.

Results obtaining at the Savage property of the McKinley-Darragh give reason for more or less optimism. High grade ore has been encountered from time to time, and recently the deposition of silver has shown a tendency toward better consistency, according to unofficial reports. While the Savage has heretofore been found to contain more or less erratic silver deposition, there would appear to be no geological reason why more consistent shoots should not occur. During the past several weeks an aggressive development program has been followed.

Prospecting Doherty Area.

Up to the present, interests identified with the Buffalo Mines have been the most aggressive operators in the Doherty silver area. On the group of claims held

by that company, surface work has been carried on sufficient to more than cover assessment work requirements for the first two years. As yet developments have shown the area to be of prospective value.

Mining Corporation Re-treating Tailings.

The Mining Corporation of Canada has commenced the pumping of the sands and slimes from previous operations back to the mill from the bed of Cobalt Lake for further treatment. The operation is perhaps on the largest scale even undertaken in Canada, upwards of half a million tons of material being available for treatment. This contains several ounces of silver to the ton.

The pumping equipment is the most powerful in the Cobalt camp and consists of two eight inch electrically driven pumps with a capacity of from one thousand to twelve hundred tons of sands every twenty-four hours. Changes already completed in the mill will permit of the treatment of about 350 tons per day and this will be gradually increased to about 700 tons per day. After being pumped from the lake the sands and slimes will be dealt with in three classifiers with a combined capacity of 1,200 tons daily.

The slimes will be treated in the low grade cyanide mill while the sands will be passed on to the tube mills for regrinding and will then go over the concentrating tables to two Groch flotation machines which have been installed. A large surplus of the material from the lake is being pumped up for use in the winter months, when the lake is frozen over. Meantime from underground the Mining Corporation continues to yield large quantities of silver and with the treating of sands and slimes under way the entire plant is again being placed in operation. The company has already produced an amount of silver in excess of the reserve estimated at the close of the last fiscal year, but it is anticipated that heavy production will be continued for some time.

The financial position of the company is exceptionally strong, the quick assets being in the neighborhood of \$3,500,000 and when the probable profit on the known ore reserves is taken into account it is conservatively estimated another million dollars may be added to this amount.

Recently the company discontinued work on the claims which it had under option in the Rickard township district, and according to reports has commenced the removal of the machinery. The claims which were being examined in the Fort Matachewan district were also given up, as has also been the Waldman property, which was being explored by the company. Last week it was announced that the Kennedy claims in the Boston Creek district were to be worked by the Mining Corporation, while it is now said the company are taking an option on control of the Ophir property. Besides their activities in Northern Ontario, a fluorspar property is being developed under the management of this concern in the Madoc district near the town of Peterboro and regular shipments of this mineral are being made in increasing quantities.

Bucke Township Attracts Attention.

Considerable scouting is being done by prospectors in various sections of the township of Bucke. The movement has received added impetus since the successful operation of the Green Meehan, and since the commencement of diamond drilling on property recently acquired at North Cobalt by the Mining Corporation of Canada.

Genesee.

The Genesee has been handicapped during recent weeks by a heavy flow of water at the 500 ft. level, and

progress has not been as rapid as was anticipated. However, additional pumping equipment has been secured and will be pressed into service at once. This will enable the management to proceed with the proposed extensive exploration program along the fault zone encountered early in the summer.

Considerable ruby silver was in evidence along the fault plane during the course of the limited amount of exploration work carried on.

Staking Claims in Thackery.

Considerable claim staking has been going on during the past two weeks or so in the township of Thackery. Quartz veins carrying gold values occur in that area, which fact seems to be attracting a number of prospectors. Gold was found in Thackery upwards of one year ago. The township lies east of the Temiskaming and Northern Ontario Railway, in a direct line between Bourk's Siding and the Lightning district.

According to late advice, the power plant at Sandy Falls, on the Matagami River is being run at reduced capacity, and that during July it served to meet the requirements of the Porcupine mines while repairs and extensions were being made at the Wawiatin plant.

There is no question, however, but that when conditions in the gold camp become more normal, both plants will be taxed to their utmost capacity to meet the requirements of the Porcupine mines.

We were informed here last week that the Sandy Falls plant was now closed.

Mining Ore at Savage Mine.

Three machines are employed on development and breaking ore at the Savage property of the McKinley-Darragh-Savage mine, at Cobalt. Later on it is expected additional forces will be added. As a result of the present work on the Savage a substantial amount of mill rock is being broken down.

ALBERTA COAL PRODUCTION.

The Toronto "Globe" recently published the following: In the Edmonton district of the Alberta coal-fields the mines have been running on low output recently. The Humberstone Mine, which has been producing 550 to 600 tons a day out of a total capacity of 1,000 tons, had to shut down for a week recently on account of lack of orders. Unwarranted reports that anthracite would be shipped to Manitoba from the East caused a falling-off in orders, it was stated by mining men. The Deputy Fuel Controller denied the authenticity of these reports, and re-affirmed the original decision that anthracite would not be shipped to the West. The mining industry of the West has suffered considerable damage as a result of the conflicting reports, as consumers had held off from ordering Western in the expectation of securing anthracite. The lack of orders has had an unfavorable effect on the industry, causing shutdowns. The facts of the case are that no coal will be shipped from the East, for any point except Winnipeg, and even this city will receive very little.

A comparison of the total output of coal in Alberta for the first six months of 1917 and 1918 is as follows:

	1917.	1918
January	514,974	646,338
February	459,408	481,407
March	467,453	435,094
April	211,901	407,087
May	100,165	414,075
June	104,779	*430,000
Total	1,858,680	2,814,001

* Estimated.

Minerals of British Columbia

By E. Jacobs.

The more important mineral products of British Columbia in regard to value of production, are gold, silver, lead, copper, zinc, and iron, among the metaliferous minerals, and coal and coke, the most prominent of the non-metallic products.

Perhaps iron should not be included in this summary, since it has not yet been produced in very considerable quantity, but that it will yet be is the confident expectation of many. In this connection the following excerpt is made from the Report of the Canada Munition Resources Commission, published several months ago: "The people of British Columbia have been making an effort to awaken interest in the establishment of an iron industry in that province, and while it can be shown that ores of merchantable quality exist, and that there is a supply of both fuel and limestone for smelting purposes, there is a notable hesitancy on the part of capital to launch such an undertaking. This condition is perhaps due to the fact that British Columbia does not at present possess a sufficient market to absorb the products of such an industry, and the success of the venture would perhaps rest with the ability of the operators to market their product in the neighboring states of Washington, Oregon, and California."

As there is abundant official information easily obtainable relative to the occurrences and production of the other minerals above mentioned, except, perhaps, zinc, which had not been continuously produced in comparatively large quantity prior to quite recent years, it is not intended to here give information concerning those minerals, an exception being made of zinc so that a quotation may be made from the Report of the Canada Munition Resources Commission, as follows:

"Heretofore the chief source of zinc has been the by-product zinc blende of the British Columbia silver-lead mines in the Slocan, which usually contains silver in varying quantities somewhat increasing its value. The blende is not in sufficient quantity or purity for the usual retorting in Belgium ovens. There has been too much of it to be ignored by the mine owners, and too little of it to make an attractive source of supply for the smelteries. This condition has been investigated by spelter producers and committees, all of whom seem to have arrived at the conclusion that such ores of zinc were unsuited to the ordinary retorting processes and that the supply is not sufficient to justify the establishment of retort smelteries in British Columbia, especially under the existing conditions of high fuel and labor costs.

"The matter is reviewed in the 'Report of the Commission appointed to investigate the Zinc Resources of British Columbia, and the conditions affecting their exploitation,' and in a report by Dr. A. W. G. Wilson on 'Production of Spelter in Canada,' both published by the Mines Branch, Ottawa, in 1906 and 1916, respectively. Some of the features which must be considered with the stimulation of increased prices for spelter and the desire of producers to reduce their own zinc ores instead of marketing them in the United States at little or no profit, are: (1) A desire to make the most of the undesirable blende by-product of the silver-lead mines; (2) the establishment of an electrolytic zinc refinery at Trail, B.C., which promises in time to offer a better market than American smelteries; (3) the large existing reserves of complex zinc

ores which it is expected can be treated at Trail; (4) the probability of new discoveries now that complex or dirty zinc ores are within the possibility of a profitable market."

While there are incidental allusions to one or two minerals occurring in Alberta and Yukon Territory, respectively, practically all the information that follows relates to those of British Columbia. It is not claimed that the list, as here given, is complete, but it is believed to be sufficiently full to be likely to prove of some value to those who are or shall be interested in ascertaining what minerals are known to occur in British Columbia, and who may not wish to go to the trouble of examining for themselves the various official and other publications from which the greater part of the information that follows has been taken.

Actinolite.—A list of occurrences of actinolite (silicate of calcium, magnesium, and iron) in British Columbia is given in Geological Survey Memoir 74, "A List of Canadian Mineral Occurrences," Robt. A. A. Johnston (No. 1497), D.3.

Alunite and Pyrophyllite.—The mining recorder for Quatsino division, Vancouver Island, in one of his official reports (see "Annual Report of Minister of Mines, B.C." 1914, p. K 377): "Besides some development work done, the San Juan Mining and Manufacturing Co. has shipped 75 tons of natro-alunite ore from its property situated on Kyuquot Sound, and has now 250 tons ready for shipment." This occurrence of alunite and pyrophyllite was considered of sufficient interest for the reprinting in the "Annual Report on the Mineral Production of Canada," 1914 (Mines Branch, Ottawa), as pp. 177-182, of a long extract from the report of Chas. H. Clapp, in the "Summary Report" of the Geological Survey of Canada, 1913, p. 109.

Antimony.—In the "Annual Report on the Mineral Production of Canada," 1914 (Mines Branch, Ottawa), p. 57, it is stated that: "In British Columbia some of the lead ores contain a small percentage of antimony—about one-third of one per cent. Some refined antimony was recovered at Trail in 1907 and 1909." During a number of years the antimony in the lead ores treated at Trail was not saved, the cost of recovery having been higher than the then obtainable price.

Probably the best known occurrence of antimonial ore in British Columbia was one in Slocan mining division, West Kootenay district, on a claim situated at a high altitude and distant about ten miles north or northwest of Three Forks. A second attempt to mine ore there on a commercial scale was made in 1915; one carload was shipped to Great Britain and another to Chicago, but results were not made public. More work was done in 1916, and ore was packed down to Three Forks for shipment, but the operator did not meet with much encouragement to continue his venture. Specimens of the ore exhibited contained much antimony. It is understood that Dr. W. F. Ferrier, of Toronto, examined this occurrence of antimony, but, if so, his report is not at hand.

Other occurrences in British Columbia have been reported from Wilson Creek, which flows into Slocan lake at Rosebery, and in the neighborhood of San Juan, Vancouver Island.

Arsenic.—It was reported last year that arsenic had been recovered from a gold-bearing ore mined and milled in Camp Hedley, Similkameen district, but if so

no authentic information has been obtained concerning it. Mr. Chas. Camsell deals fully with the arsenical iron ores of that camp in one of the Geological Survey reports on his geological investigations in Similkameen district.

Asbestos.—From time to time the discovery of asbestos has been reported but, so far as known, no commercial asbestos has yet been found in British Columbia.

Barytes.—The occurrences of this mineral as a pigment of commercial value does not appear to be known in the province. Gold-copper ore with a barytic gangue has been mined in considerable quantity in mines on Mt. Sicker, Vancouver Island; in fact, the smelting of that ore was a successful achievement of Mr. Thos. Kiddie, after he had built the Tyee Copper Co.'s smelting works at Ladysmith, favorably commented on in one of his published official reports by the Provincial Mineralogist for British Columbia.

Cobalt.—The occurrence of Cobalt in a gold-bearing ore found in Omineca mining division, along the Grand Trunk Pacific railway, has been reported in quite recent years, but whether in recoverable quantity commercially has not been ascertained.

Chromite.—Chromite has not been, until recently, of economic importance in British Columbia. It is mentioned that in Tulameen district minute diamonds have been discovered associated with chromite, which is an accessory constituent of the peridotites there (see Geological Survey Memoir No. 26, "Geology and Mineral Deposits of Tulameen," Camsell, pp. 146-153). Recently some chromite has been shipped from Cascade, Mr. P. B. Freeland reported last year that on one claim at Cascade there are lenses of ore carrying 30 to 50 per cent. chromium, while the rock carries 3 to 10 per cent. chromium.

Fluorite.—An occurrence of fluorite near Nelson, West Kootenay, was some time ago investigated as a possible source of production of this mineral, but no commercial result followed.

Early in July of the current year the Grand Forks Gazette reported the acquirement, under lease and bond, by the Consolidated Mining and Smelting Company of Canada, of a fluorspar property situated about 20 miles from Grand Forks, Boundary district, on Kennedy Creek, a tributary of the north fork of Kettle river, into which it flows from the west near Lynch creek. The Gazette made the following comment: "The showing of fluorspar is said to not be equalled by any other property on the continent, and the Consolidated Co. has manifested its confidence by acquiring possession. It intends doing considerable development work and may install a diamond drill to test the immense deposit."

Among other uses is that in the manufacture of hydrofluosilicic acid, employed as an electrolyte in the electrolytic refining of lead. In 1916 the Consolidated Co. resumed at its works at Trail, West Kootenay, the manufacture of hydrofluosilicic acid for use there. Figures showing imports to Trail of this acid during five years, 1910-1914, are printed on p. 244, "Annual Report on Mineral Production of Canada," 1914.

See also "Fluorite," Geological Survey Memoir 74, "Canadian Mineral Occurrences," p. 96.

(Concerning the demand in Canada for fluorspar, Mr. John McLeish, Chief of the Division of Mineral Resources and Statistics, Mines Branch, Ottawa, in the "Preliminary Report on the Mineral Production of Canada," 1917, stated that "there is an annual consumption of fluorspar in Canadian steel furnaces of

from 10,000 to 15,000 tons," while he showed the production in the Dominion to have been 4,249 tons in 1917 as compared with 1,284 tons in 1916.)

Graphite.—Newspaper reports of the finding of graphite have been published, but there has not yet been any production of this mineral in the province.

Gypsum.—Small production was made in British Columbia in 1911 and 1913, but the industry is still in its infancy. In "Economic Minerals of Canada," (Mines Branch, Ottawa, No. 322), on p. 44, the following note is printed: "Gypsum is found in British Columbia at the following places: Salmon river, in the southern part of the Kamloops mining division; Spatsum, on the main line of the Canadian Pacific railway, about 189 miles to the northeast of Vancouver; on the banks of the Thompson river, about 20 miles north of the town of Kamloops; at Merritt, in the Nicola valley, and in Tulameen district, on Granite creek, about 10 miles up the Tulameen river from the town of Princeton."

The Provincial Mineralogist, in the "Annual Report of the Minister of Mines," 1907, pp. L 134-135, briefly describes the deposit at Spatsum. The closing paragraph follows: "The deposit may be said to have a length of at least 2,000 ft., with a thickness of more than 40 ft. The layers comprising the bed are of varying hardness and purity, but there appears to be no doubt that the deposit is capable of providing a large tonnage of very pure mineral. The property is so situated that the mineral could be delivered by aerial tramway directly to the Canadian Pacific Railway track at Spatsum, on the opposite side of the Thompson river."

Hydromagnesite.—In Memoir 74, "Canadian Mineral Occurrences," it is stated, on p. 127, that extensive deposits of earthy hydromagnesite occur in the neighborhood of Atlin; also that hydromagnesite has been met with in considerable abundance in the vicinity of the 180-Mile House, on the Cariboo road.

In the "Annual Report of the Minister of Mines, B.C." 1915, p. K-28, it is noted that a deposit of hydromagnesite near the town of Atlin was worked to some extent in 1915 by Armstrong & Morrison, of Vancouver. It is known that a few hundred tons were shipped, but details regarding the shipment were not received. This occurrence of magnesite was fully described in the "Report of the Minister of Mines, B.C." for 1904.

The following brief reference to the Atlin deposit is made in the Report of the Canada Munition Resources Commission: "Certain deposits of hydromagnesite are found at Atlin, in Northern British Columbia, but their inaccessibility has so far prevented their utilization except for experimental purposes. They would, however, become active producers if steel works should be established on the Pacific coast."

Magnesium Sulphate.—"A deposit of magnesium sulphate, near Kruger mountain, Osoyoos mining division, was worked for a time during 1915. The mineral occurs in a flat depression known as Spotted lake, which is a partially dried-up lake containing alternate circles of water and dry places. The magnesium sulphate occurs as a layer all over the lake bottom, covering a considerable area and said to be of exceptional purity; the thickness of the deposit has not been definitely ascertained. Some 300 tons was extracted and shipped to New York, where a market at a good price was obtainable. The material is used in the drug trade. The nearest town to the deposit is Oroville, Washington, U.S.A., which is distant about six miles." (See "Annual Report of Minister of Mines, B.C." 1915, p. K28.) No information has been received relative to later operations, if any.

In 1917, newspaper reports told of the discovery of an occurrence of this mineral in Clinton mining division, but no particulars have been obtained.

Manganese.—A little information is given in the Report of the Canada Munition Resources Commission relative to manganese ores of Alberta and British Columbia, as under:

"In the early summer of 1917 certain manganese deposits in Southern Alberta were examined by the Geological Survey of Canada at the request of the Commission. The geologists who made the investigation reported the existence of some deposits, from calcareous springs, which contained less than ten per cent. of manganese. The deposits are not regarded as a valuable source of manganese ore.

"Some activity has been displayed in developing an occurrence of manganese ore near Kaslo, on Kootenay lake, British Columbia. This locality was also examined for the Commission by the Geological Survey. Indications at first gave the impression of a small tonnage of 40 per cent. ore, but subsequent development work has uncovered more ore, and the operators have secured license to export several hundred tons to the United States." (Note.—This deposit is situated alongside the Kaslo and Slocan railway, about six miles west of Kaslo. The property is under bond to Seattle, Washington, men who commenced shipment of the ore in June. A district newspaper stated at the beginning of July that "first shipments of manganese ore from the Kaslo district were made two weeks ago, and now ore is being shipped at the rate of two to three carloads a week. The ore goes to a ferro plant at Lebanon, Pennsylvania, for treatment. It is said that the product will ultimately reach the works of the Carnegie Steel Co." So far as known, this is the first time manganese ore has been shipped in bulk from British Columbia.)

Mercury.—There was a small production of mercury from deposits of cinnabar at the western end of Kamloops lake in 1895-1897, but none since. The deposits consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks. (See "Annual Report of Mineral Production of Canada," 1914, p. 135.)

Some prospecting work was done several years ago in the neighborhood of Sidney inlet, west coast of Vancouver Island, where indications of the occurrence of cinnabar were found. It has lately been reported that the Canada Department of Mines has arranged for one of its officials to examine this occurrence this season.

Several other occurrences in British Columbia are known (see Geological Survey Memoir 74, "List of Canadian Mineral Occurrences," p. 71 and p. 155).

Mica.—Muscovite is found in various places in British Columbia in pegmatite dikes. Some notes on "Mica at Tete Jaune" are printed on pp. K 56-57 of the "Annual Report of the Minister of Mines, B.C." 1915, giving information obtained by the Assistant Mineralogist when in the district several years ago. Tete Jaune is in the northern part of Cariboo district, on the Grand Trunk Pacific railway. The mica claims are situated high up on the rocky ridges of the mountains, on the south bank of the Fraser river, at altitudes of from 5,000 to 7,000 ft. "A very large pegmatite dike, or series of dikes, which is said to be 25 miles long and varying in width from 25 to 1,800 ft., is intrusive into the older rocks along the axis of the range, and extends from below Tete Jaune to Albreda summit, near to Canoe river. This pegmatite is, of course, not exposed continuously along this length, but is sufficiently

so to consider that the various outcrops are linked together, at least not far below the surface. This pegmatite is the usual typical one consisting of large crystals of mica, feldspar, and quartz, with in places a fine-grained intergrowth of feldspar and quartz. The mica occurs in sheets up to 10 in. square and with a thickness, of numerous sheets together, of one inch to two inches. The Albreda group was worked for a time in 1915, and in seven weeks three men took out two tons of mica from a surface quarry. This mica was taken down to Tete Jaune, where it was stored and it was seen by the writer. . . . About 50 per cent. of the two tons taken out would trim into pieces about three by five inches with, of course, some larger than that; the remainder would average about two by three inches. It is certainly good commercial mica, but it is not of the highest quality. It has an excellent cleavage and is not brittle, and would be easy to trim as desired. It is mainly a muscovite mica, but some of it is considerably stained with iron."

See also "Mica, Its Occurrences, Exploitation, and Uses," by H. S. de Schmid, Mines Branch, Department of Mines, Ottawa, No. 118.

Molybdenum.—The first production of molybdenite in British Columbia, so far as official records show, was that from the Molly molybdenite group, on Lost creek, in Nelson mining division, West Kootenay. For particulars of this occurrence of molybdenite see "Transactions of The Canadian Mining Institute," 1915, Vol. xviii, pp. 247-255, or the "Monthly Bulletin" of the Institute, No. 43, for November, 1915, pp. 872-880, by the late Dr. Chas. W. Drysdale, of the Geological Survey of Canada, who stated that Mr. R. A. A. Johnston, Mineralogist of the Survey, reports that there are 20 different localities in British Columbia where molybdenite is known to occur. About 50 tons of molybdenite ore had been shipped from the Molly property up to the time of Dr. Drysdale's visit to it. Later, further development of the property was undertaken, with 16 men employed. A Vancouver, B.C., syndicate had an option of purchase and it proposed to equip the property with a small concentrating plant, but, so far as known, the enterprise was not carried to the point of regularly maintaining shipment of ore.

The Provincial Mineralogist mentions, in the "Annual Report of the Minister of Mines, B.C." 1915, p. K 27, another property, on Alice arm of Observatory Inlet, Skeena mining division. Particulars of this property were obtained in September, 1916, for the Canada Munition Resources Commission, by Prof. J. C. Gwillim, of Kingston, Ontario. In the published report of the Commission it is stated that "Mr. Gwillim was instructed to proceed to British Columbia in the Fall of 1916 for the purpose of reporting on the possibility of the increased production of the ores of molybdenum, tungsten, and zinc. . . . Complete reports on his work, illustrated with maps, photographs, and line drawings, have been filed with the Commission, but publication in full at this time is undesirable from the point of economy. It is probable, however, that arrangements will be made with the Canada Department of Mines to publish the reports at a later date."

See "Annual Report on the Mineral Production of Canada," 1915 (Mines Branch, Ottawa), p. 337, for notes on the Molly mine, mentioned above. Also, see "Report on the Molybdenum Ores of Canada," No. 93, Mines Branch, Canada Department of Mines, Ottawa. Particulars of the Alice Arm property are included in the "Annual Report of the Minister of Mines, B.C." 1916, and of molybdenum in Lillooet mining division, B.C., in Geological Survey publications.

Petroleum.—A note by the Provincial Mineralogist in the "Annual Report of the Minister of Mines, B.C." 1915, p. K 27, is that "prospecting for petroleum by means of boreholes has been in progress in Southeast Kootenay, and on the Queen Charlotte islands, and elsewhere, but oil in commercial quantities has not yet been encountered."

In the provincial "Annual Report" for 1914 there is reprinted, on pp. K 238-242, a report made for the Flathead Oil Syndicate on "The Oil Possibilities of the Flathead District, B.C." (which district is in Southeast Kootenay), by Mr. Ralph Arnold, a well-known geologist, of Los Angeles, Southern California, who for some years has made a special study of oil fields.

Platinum.—"In past years the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen (Tulameen) district. . . . More attention is being paid to the recovery of this metal, especially in the Similkameen, where it is proposed to re-work some of the old placers. One or two companies operating in the Quesnel River district (Cariboo), report small quantities of platinum with placer gold, but the information is not sufficiently definite for record." (See "Annual Report on the Mineral Production of Canada," 1914, Mines Branch, Ottawa, p. 147; also for table of production.)

The Provincial Mineralogist reported for 1915 (see "Annual Report of Minister of Mines, B.C.," p. K 27): "A small quantity of crude placer platinum has been recovered on the Tulameen river, in the Similkameen district, estimated at about \$2,000 in value. This was obtained from placer-gold workings being carried on, and the results are considered encouraging." Some platinum was recovered in 1915 on the main Tulameen river, and some from Granite creek and probably other tributary streams.

Dr. W. F. Ferrier and Mr. Chas. Camsell paid a very brief visit to Tulameen in November, 1917, when passing through the district from Nicola to Princeton. The former included in his report to the Munition Resources Commission the following notes on platinum: "New work on the Tulameen, B.C., platinum deposits was investigated, but reports of the results obtained were found to be much exaggerated. The year's production was somewhat less than 200 oz. of platinum. The claims of the Contact Consolidated Gold Mines, Ltd., near Paulson, B.C., were examined. Here platinum was reported to occur in the quartz veins and associated dikes. The results of the examination will be handed to you later after the necessary assays have been made."

Information relative to platinum may be found in Geological Survey Memoir 26, "Geology and Mineral Deposits of the Tulameen District, B.C.," (No. 1206) by Chas. Camsell, who made extensive geological investigations during several field-work seasons spent in the district. Brief excerpts from his report follow: "The platinum recovered from the gravels of this district has been variously estimated at 10,000 to 20,000 ounces, and at one time this district was the principal producer of platinum on the North American continent." Above Slate creek "the placers of the Tulameen contain both gold and platinum. . . . The proportion of platinum to gold is greater here than in any of the other localities, and in mining it was found to increase upstream as far as the mouth of Eagle creek, where the greatest quantity was obtained. At hydraulic workings a short distance below the mouth of Eagle creek the proportion of platinum recovered was greater than that of gold, and nuggets of platinum which weighed from

one-fourth to one-half an ounce each were often found." Mr. Camsell's report gives, on p. 143, a table showing the amount and value of platinum recovered from Tulameen river.

Prof. J. F. Kemp, of the faculty of Columbia University, New York, in 1900 spent three months investigating the source of the Tulameen platinum. His report and conclusions were printed in "Bulletin of the United States Geological Survey," No. 193.

Pyrites.—Dr. Alfred W. G. Wilson, in "Pyrites in Canada," (Mines Branch, Department of Mines, Ottawa, No. 167), states that the mineral pyrites is reported from many localities in British Columbia. Of these, two deposits are worthy of special mention, namely, one on a tributary of Eestall river, and the other, the Hidden Creek mine, Observatory inlet, both in Skeena mining division. It was reported last year that a shipment of pyrites was made by the Granby Consolidated Co. from the latter deposit to works in the neighborhood of Vancouver, B.C.

Salt.—A salt deposit, discovered in 1910-11 in a basin on the Kwinitsa river, which flows into the Skeena near the 46th mile-post on the Grand Trunk Pacific railway, is described in the "Annual Report of the Minister of Mines, B.C.," 1913, pp. 85-87.

Scheelite.—The tungsten-bearing mineral, scheelite, occurs at several different places in British Columbia. In Cariboo mining division it is found with tungstite at Hardscrabble creek, and in the placer deposits of Antler, Lowhee, and China Creek claims. In Nelson mining division, West Kootenay, it occurs with tungstite and wolframite at the Kootenay Belle mine, Sheep creek, and at the Granite-Poorman mines, near Nelson city. In Slocan City mining division, also in West Kootenay district, its occurrence has been noted in quartz veins in the Meteor mine, on Springer creek. It is not produced commercially in the province.

Under the subhead "Tungsten," the Report of the Canada Munition Resources Commission includes notes respecting tungsten in British Columbia and Yukon Territory, as follows:

"There have been no important developments since Dr. T. L. Walker's 'Report on the Tungsten Ores of Canada' was published by the Mines Branch, Ottawa, in 1909. The occurrences there described in the Kootenay Belle (Sheep creek), Granite-Poorman (Nelson), and Meteor (Slocan) mines, West Kootenay district, and that on St. Mary's creek, East Kootenay district, were inquired into, and no developments of commercial value seem likely.

"There has been no production from the deposit on Hardscrabble creek, in the Cariboo district, but the property has been further developed and kept open. At the time of Dr. Walker's inspection 'the mine was idle, but from those interested it was learned that a shaft had been sunk about 30 ft. in the rock and drifting along the tungsten zone had been carried about 50 or 60 feet.' The Provincial Mineralogist of British Columbia entered these workings, which are below the creek level, and inspected them as far as conditions would allow, the rock faces showing small veins or veinlets of scheelite. Mr. J. A. McPherson, of the Cariboo-Chisholm Creek Mining Co., Ltd., Van Winkle B.C., writing on November 24, 1916, describes this property and appends a sketch of the workings. He states that the deposit is 11 miles from Barkerville, 50 miles from Quesnel, and six miles from the main Cariboo road. From further examination and analysis since Dr. Walker's inspection he finds 'the zone of payable ore containing about 10 per cent. tungstic acid will be 12 ft. in width; oxidized ore in the new tunnel work

17.9 per cent WO_3 ; general value of the sides of the new tunnel 12.3 per cent WO_3 . The property was put in first-class shape in September, 1915.

"Dr. W. F. Ferrier reported to Mr. J. C. Gwillim the occurrence of wolframite at the head of Mud creek, on Rocher Deboile mountains, near Hazelton, which has been described in the 'Report of the Minister of Mines, British Columbia,' for 1916. It is there stated that the wolframite is distributed through mineralized stringers from 3 in. to 2 ft. 6 in. in width which occur in granite.

"A few hundred pounds of scheelite and wolframite have been shipped from placer workings in the Yukon, and more may be saved during the coming season. The late Dr. Cairnes has presented information on this subject in the 'Summary Report of the Geological Survey' for the year 1916."

Sodalite.—A fine, blue sodalite, which is a silicate of alumina and sodium, and is used in the fine arts and in jewellery, occurs near Ice river, in Golden mining division, Northeast Kootenay.

Tripolite.—Tripolite, or diatomaceous earth, is known to occur in several places in the province. In the "List of Canadian Mineral Occurrences," it is given as occurring in Cariboo, Clinton, New Westminster, and Quesnel mining divisions, and on Vancouver Island. A deposit of unknown size was reported from Queen Charlotte Islands in 1914. A deposit within ten miles of the city of Victoria is briefly described by Mr. Chas. H. Clapp in Geological Survey Memoir 36, "Geology of the Victoria and Saanich Map-Areas, Vancouver Island," pp. 171-172.

Dr. W. F. Ferrier reported to the Canada Munition Resources Commission that "information and samples were obtained of a large deposit of very fine-grained diatomaceous earth, of a pure white color, at Deadman lake in the Kamloops district. Several polishing powders now on the market are composed of a similar material."

Miscellaneous.—In his notes, published in the report of the Canada Munition Resources Commission, Dr. W. F. Ferrier includes the following:

"A mineral which I found to contain strontium was handed to me in the field and is now being analyzed. It was too late in the season to visit the locality.

"A sample of nickel-ore was given to me at Keefer, B.C., but it proved to be chromite. It is said to occur in the country west of Kanaka, on the Fraser river, but I have not yet ascertained the precise locality.

"The report of a discovery of potassium salts in the Nicola Valley, which I was instructed to investigate, proved to be without foundation."

It may be added that several years ago a discovery of tin-bearing ore was reported to have been made in the neighborhood of Fish river, probably in Lardeau mining division, but the locality was not easily accessible, and little has since been heard of it.

Structural Materials and Clay Products.—Three works for the manufacture of Portland cement have been erected and equipped in British Columbia—at Tod inlet, and at Bamberton on the other side of Saanich inlet, both on Vancouver Island, and at East Princeton, Similkameen. Only that at Tod inlet, however, has been a continuous producer on a comparatively large scale.

Clay products comprise an important industry in the neighborhood of Victoria, Vancouver Island, these including chiefly common brick, pottery, drain and sewer pipe, tile, etc. Bricks of various kinds, including ornamental and fire, and fireclay products generally, are made at works in Clayburn district 30 to 40 miles from Vancouver city.

Lime, sand, gravel and other materials are available for all building purposes in various parts of the province. Building stone includes granite, limestone, marble, sandstone, and slate. Marble is found on the west coast of Vancouver Island, on Texada Island, and in the neighborhood of Kootenay lake; from quarries in the last-mentioned district marble has been shipped east to the prairies.

Mineral Water.—The best known mineral springs in the province are those at Harrison lake; Haleyon and Leon, on Arrow lake; Ainsworth, on Kootenay lake, and the Sinclair springs in Northeast Kootenay. Mineral water is shipped from one or two of these springs, but not in very large quantity.

PERSONAL

Mr. A. A. Hassan is in New Brunswick examining manganese and pyrrhotite deposits. He will also make examinations of the Montague gold deposits and the Bradford gold mine in Nova Scotia.

Mr. A. G. Burrows, of the Ontario Bureau of Mines, has returned to Toronto from Northern Ontario.

Mr. C. W. Knight has returned to the Abitibi area which has been surveyed recently.

Mr. Samuel W. Cohen has returned to Montreal after a month's tour of inspection of mining properties in Northern Ontario, Nevada, and Colorado.

The Chicago Pneumatic Tool Co. announce that contract has been let and work started on the erection of an up-to-date addition to their Cleveland Plant, which is planned to double the present output. It is expected that work will be completed on the building itself about November first. The necessary equipment has been ordered and it is believed will be delivered and ready for installation by the time the building is completed, so that the additional production contemplated will be available very soon thereafter.

Dr. M. Y. Williams, who has been recently working in the Glencoe oil field is now at Dutton.

Mr. W. K. McNeil will have charge of the exhibit of the Ontario Bureau of Mines at the National Exhibition, Toronto.

Sir John W. Carson, President of the Crown Reserve Mining Company, Limited, to which company Samuel W. Cohen is Consulting Engineer, recently inspected the Alice property at Idaho Springs.

REFINING GOLD AT OTTAWA MINT.

Ottawa, Aug. 15.—Since the outbreak of war gold coin and gold bullion to the value of \$1,300,000,000 have been received at Ottawa by the Department of Finance as trustees for the Imperial Government and the Bank of England. How the work of the Royal Mint here has, in consequence, been increased is not generally realized. When these deposits of gold were received by the Department of Finance, it was necessary that their value should be ascertained and that a certain quantity of gold bullion should be refined. The heavy demand on the gold refinery at the Mint led to the construction of a second plant with a monthly output of a million ounces of fine gold. Through this extension the refinery has developed the largest capacity of any gold refinery in the world.

The special work of the refinery, due to the war, is shown by the following figures:

Gold bullion received for refining, 15,992,770 ounces.
Total gold bars produced, 14,048,803 ounces fine.
value \$290,414,547.

Fine silver recovered, 1,175,000 ounces fine.

BOOK REVIEWS.

International Mining Law, by Theo. F. Van Wagenen. Price \$3.00. Published by McGraw-Hill Book Co., New York. For sale by Book Department, Canadian Mining Journal, Toronto.

This is an attractive little volume, bound in black leather, of 327 pages and index. The author gives a brief history of mining and mining law in America. Chapters are devoted to ancient mining laws in Germany, Spain, Mexico and Central and South America. Chapters are devoted to the Australian, South African, Canadian and European, as well as to the American system of Mining Law. Digests of mining laws in many countries are given.

The latter part of the book is devoted to chapters headed as follows: The prospector, extralateral rights; discovery of ore as a prerequisite to a valid location; leasehold vs. fee simple title; free prospecting vs. licensed prospecting; prospecting areas; defects and deficiencies of the American law; miscellaneous historical notes; conclusion.

The volume is a very interesting one and should prove of assistance to those who are interested in securing laws favorable to the development of mineral resources.

Mining Engineers' Handbook. Edited by Robert Peele. Price \$5.00. Published by John Wiley & Sons, New York. For sale by Renouf Publishing Co., Montreal.

This is a volume of 2,307 pages and index. The large number of subjects dealt with is shown by the fact that the index occupies 66 pages. The volume is attractively bound in red leather.

Besides the sections dealing with mineralogy, ore deposits, methods of prospecting, exploration and mining, and mining plant of all kinds, there are others, on certain branches of civil, electrical and mechanical engineering. Mr. Peele has recognized that the mining engineer in equipping and operating mines has to deal with many branches of engineering and he has, therefore, included data that would otherwise be unnecessary. A large number of specialists have contributed sections.

The 44 sections of the book are headed: Mineralogy, by A. J. Moses; Geology and Mineral Deposits by J. F. Kemp; Earth Excavation, by H. P. Gillette; Explosives, by H. G. Haskell, F. B. Holmes, A. La Motte, and F. J. Le Maistre; Rock Excavation, by H. P. Gillette; Tunneling, by D. W. Brunton and J. A. Davis; Shaft Sinking in Rock, by H. L. Carr; Shaft Sinking in Soft, Water Bearing Soils, by F. Donaldson; Boring by A. F. Taggart; Prospecting, Development and Exploitation of Mineral Deposits, by Jas. F. McClelland; Underground Transport, by E. C. Holden; Hoisting Plant, Shaft Pockets, and Ore Bins, by Wm. M. Weigel; Drainage of Mines, by R. Van A. Noriss; Mine Ventilation, by F. E. Brackett; Compressed Air Plant, by R. T. Dana; Electric Power for Mine Service, by G. R. Wood; Surveying, by C. B. Breed; Underground Surveying, by E. K. Judd; Mine Geologic Maps and Models, by R. H. Sales; Mine Organization and Accounts, by J. R. Finlay; Cost of Mining, by J. R. Finlay; Wages and Welfare, by E. K. Judd; Mine Air, Hygiene, Explosions and Accidents, by Geo. S. Rice; Mining Laws, by H. V. Winchell; Mine Examinations, Valuations, and Reports, by Wm. Y. Westervelt;

Aerial Tramways and Cableways, by E. B. Durham; Mechanical Conveyers, by L. De G. Moss; Ore Dressing, by R. H. Richards; Ore Sampling, by T. R. Woodbridge; Assaying, by E. J. Hall; Testing of Ores, by J. E. Clenell; Notes on Selling, Purchasing and Treatment of Ores, by A. L. Walker; Gold Amalgamation and Cyanidation, by E. L. Dufourey; Preparation and Storage of Anthracite Coal, by Paul Sterling; Preparation and Coking of Bituminous Coal, by H. McKeen Conner; Mathematics and Mechanics, by C. H. Burnside; Chemical Notes and Tables; Elements of Hydraulics, by J. K. Finch; Engineering Thermodynamics by E. D. Thurston; Steam Engines, Boilers, Pumps, Turbines, Gas Engines, by H. L. Parr, E. D. Thurston, Jr., and A. L. Herrick; Mechanical Engineering Miscellany, by C. W. Thomas and H. L. Parr; Electrical Engineering, by W. I. Shickler; Elements of Structural Design, by J. K. Finch; Engineers' Tables.

The list of subjects dealt with and the names of the well known authorities who have contributed will be sufficient to interest any mining engineer in this volume. It contains a wealth of information in concise form and will doubtless be soon generally recognized as a very important contribution to mining literature. Metal miners will especially welcome it.

CHROMITE.*

By J. S. Diller.

Chromium is one of the important war metals, being extensively used as an alloy to harden steel in the manufacture of munitions.

About a dozen minerals contain chromium, but chromite, often called chrome ore or chromic iron ore, is the only mineral of commercial importance as a source of chromium. Its theoretical composition is represented by the chemical formula $\text{FeO} \cdot \text{Cr}_2\text{O}_3$, according to which it contains 68 per cent Cr_2O_3 (chromic oxide) and 32 per cent FeO (ferrous oxide). In nature, however, more or less of the chromium is replaced by aluminum or iron, so that the percentage of chromic oxide varies with the degree of replacement from more than 60 per cent down to less than 10 per cent. The value of chromite depends on the content of chromic oxide, and the price of any grade of ore is based on the percentage of chromic oxide that the ore contains. High-grade domestic ore contains 40 per cent, or more of chromic oxide. Much of the domestic chromite is of low grade, although the greater portion of it is reported to be of high grade.

The principal present applications of chromite are for metallurgic use in the manufacture of ferrochrome to make munitions of war and for furnace lining in the form of crude ore or chrome brick. Several special steels, as automobile steel and airplane steel, contain chromium, but not all of them are of special importance in the war program.

The principal chemical uses of chromite are in the manufacture of bichromate of soda, bichromate of potash, chromic acid, and chrome alum, which are employed in the manufacture of dyes and pigments and for tanning leather.

For both metallurgic and chemical uses high-grade ores are much desired. Low-grade ores can be used to greater advantage in making the alloy ferrochrome than in making chemicals. This adaptability in the manufacture of ferrochrome renders it possible greatly to extend the production and utilization of the low-grade domestic ores.

* Extracts from a report published by the U.S. Geological Survey.

To discover, if possible, the causes of decline in the production of chromite in 1917, the United States Geological Survey sent out a questionnaire to all the chrome producers on its list, asking for statements of the maximum possible production of the mine during the last quarter of 1917 and the actual shipments of chromite from the mine during the same period, the difference being the deficiency in production due to one or more causes, of which the following may be noted: Bad weather, poor roads in winter, lack of funds, lack of shipping facilities, especially lack of cars as the result of the freight embargo, low prices, and uncertainty of market, particularly for low-grade ore. The last two are the most potent causes affecting small producers.

MARKETS

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.50 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 12 cents per lb.
Aug. 29, 1918—(Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 10¼ cents to 10½ cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.
Aug. 29, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, \$10.55 per ton.
Coal, bituminous, nominal, \$9.50 per ton.

SILVER PRICES.

	New York	London
	cents.	pence.
August 28	99¾	49½

NEW YORK MARKETS.

As quoted by Engineering and Mining Journal. August 21, 1918.

Copper, 26 cents per lb.
Lead, 8.05 cents per lb.
Zinc, 9 to 9½ cents per lb.
Aluminum, 33 cents per lb.
Aluminum Sheets, 42 cents per lb.
Antimony, 14¼ to 14½ cents per lb.
Bismuth, \$3.50 per lb.
Cadmium, \$1.50 to \$1.75 per lb.
Quicksilver, \$125 per flask.

Silver, maximum \$1.01½ cents per oz.
Platinum, \$105 per oz.
Palladium, \$135 per oz.
Iridium, \$175 per oz.

STANDARD MINING EXCHANGE.

Closing prices, August 28, 1918:—

	Ask.	Bid.
Silver.		
Adanac Silver Mines, Ltd. ....	.07¾	.07¼
Bailey .....	.04	.03½
Beaver Consolidated .....	.26¾	.26
Chambers-Ferland ? .....	.13	.11
Coniagas .....	...	2.60
Crown Reserve .....	.17½	.16
Foster .....	.03	.01¾
Great Northern .....	.03½	.03
Hargraves .....	.04¼	.04
Hudson Bay .....	...	20.00
La Rose .....	.35	...
McKinley-Darragh-Savage .....	.45	.44½
Mining Corporation of Canada ..	2.70	2.50
Nipissing .....	...	8.75
Ophid .....	.07	.06¾
Peterson Lake .....	.09½	.09
Right of Way .....	.04	.03
Seneca-Superior .....	.01½	...
Silver Leaf .....	.01½	.78
Temiskaming .....	.29¾	.29¼
Trethewey .....	.27½	.25
Wettlaufer .....	.07½	.04½

Gold.

	Ask.	Bid.
Apex .....	.03	.0258
Boston Creek Mines .....	.20	...
Dome Cons. Mines .....	.03	...
Dome Extension .....	.14½	.14
Dome Lake .....	...	.11
Dome Mines	9.00	8.85
Eldorado .....	...	.½
Hollinger Consolidated	4.75	4.65
Hunton Kirkland G. M. ....	.03	.02
Kirkland Lake .....	.35	.32
McIntyre	1.45	1.44
Newray Mines, Ltd. ....	.16½	.12
Porcupine Crown .....	.12	.11
Vipond .....	.14	.11
Schumacher20	.18
Teck-Hughes17¾	.16
West Dome09¾	.09¼
Wasapika Gold Mines, Ltd.30	.25

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- 4—201 H.P.—160 lbs. Babcock & Wilcox water tube boilers,
- 5—Boiler feed pumps.
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- 1—Wainwright feed water heater.
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- 1—1,000 H.P.—98 R.P.M.—24 inch x 36 inch x 46 inch Inglis Vertical Cross Compound Condensing Engine
- 1—Canada Foundry Triplex Pump, motor driven, 300 gallons per minute, cylinders 8 inch x 12 inch.
- 2—150 K.W.—250 volt, D.C. Generators direct connected to Peerless Self-oiling automatic engines, 125 lbs. working pressure, 230 R.P.M.
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- 4—200 K.W., 360 R.P.M., single phase, 60 cycle, 2,200 volt C.G.E., A.C. Generators
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- 2,000 Poles in various lengths, 60 ft. to 20 ft., cross-arms, brackets, insulators, etc.
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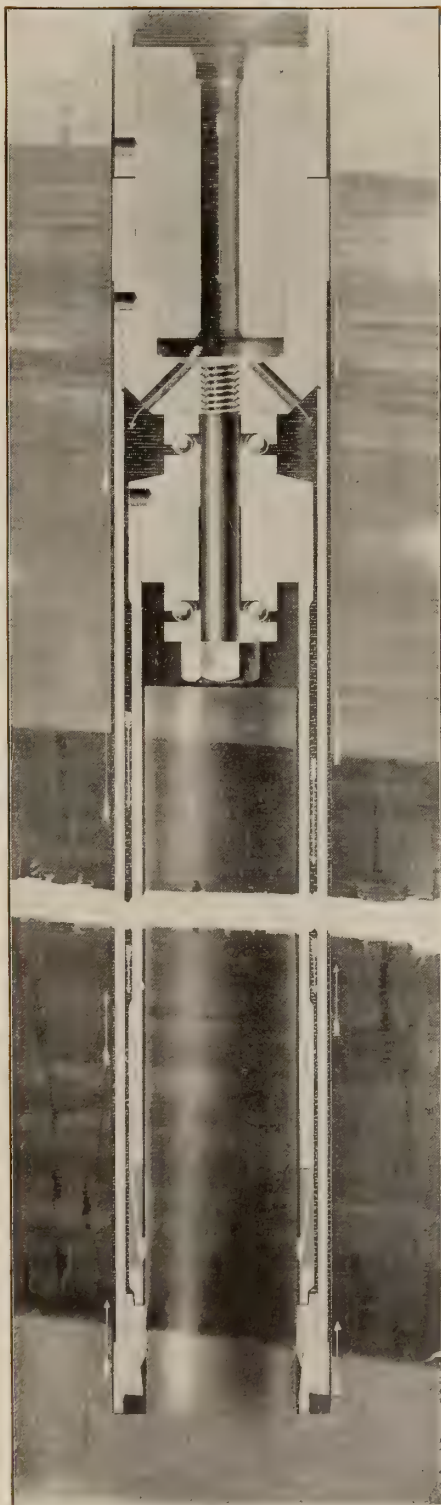
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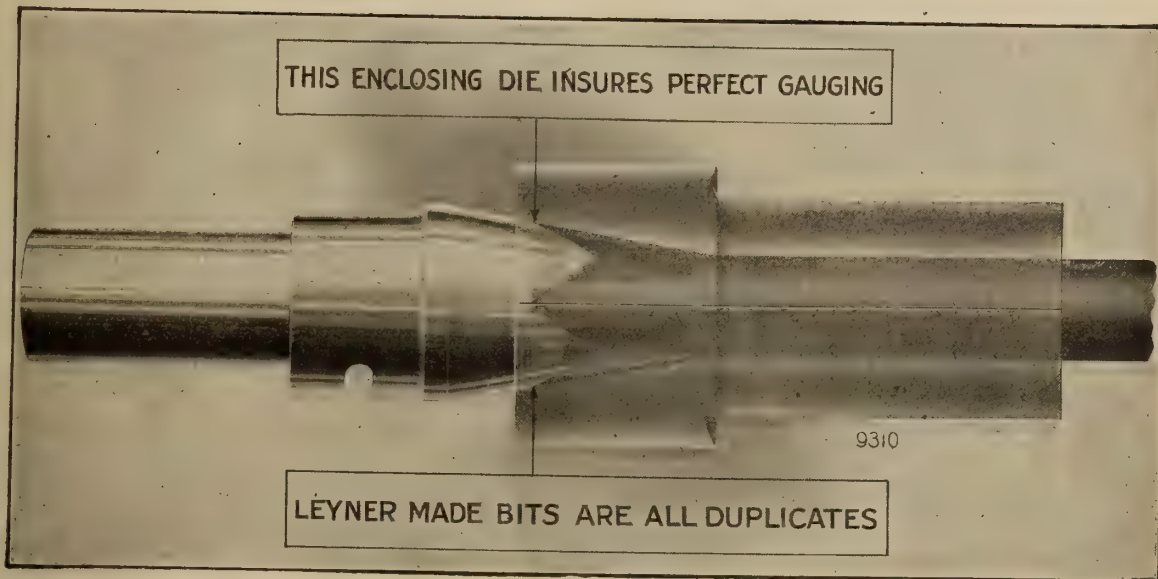
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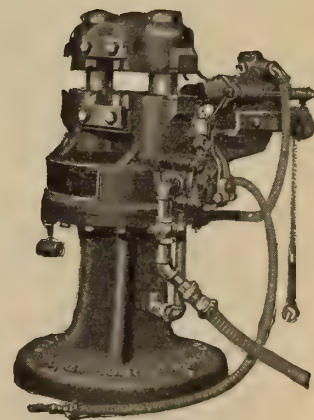
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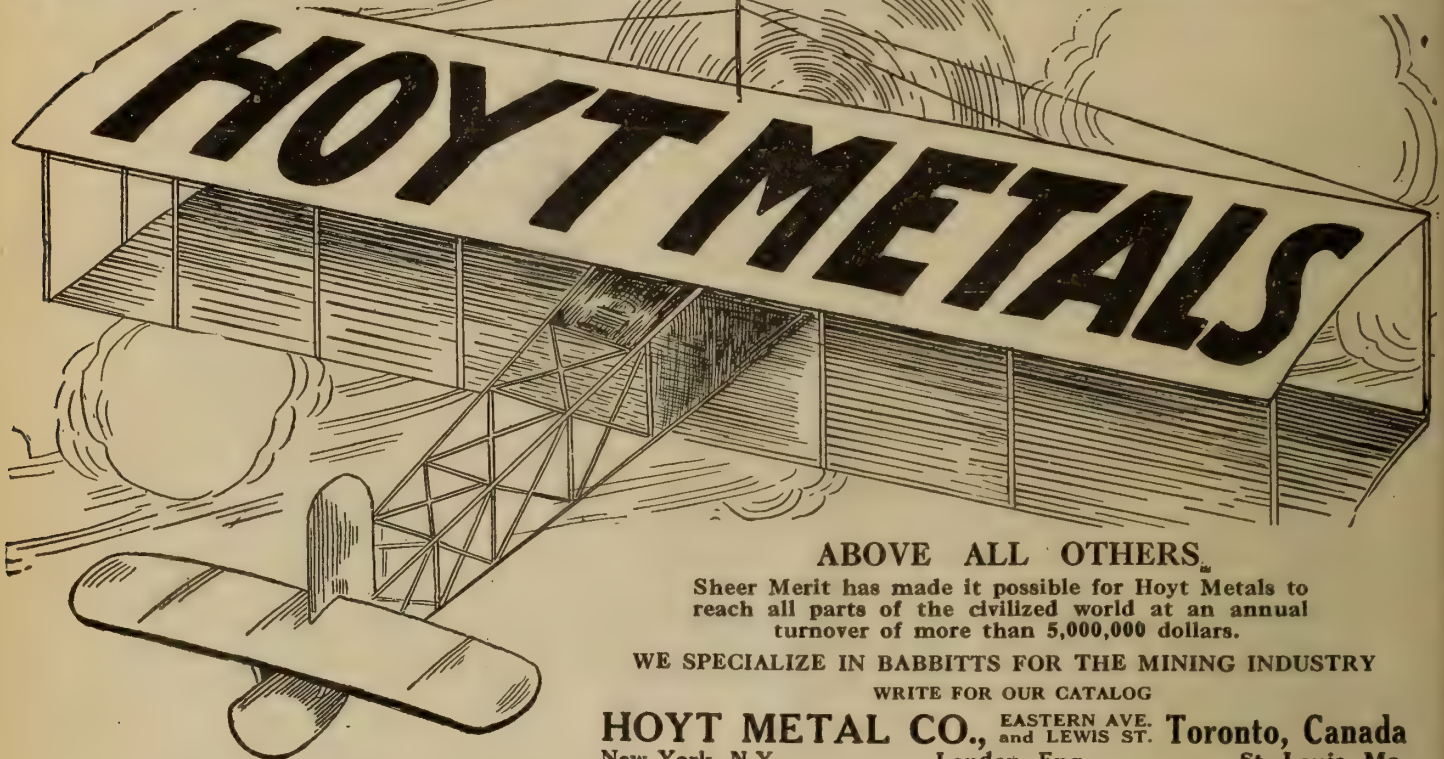
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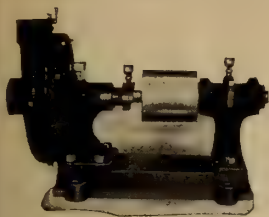
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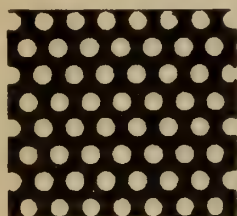
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MINES BRANCH

Department of Colonization, Mines and Fisheries

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SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

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Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

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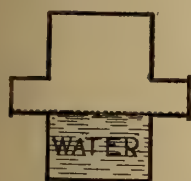
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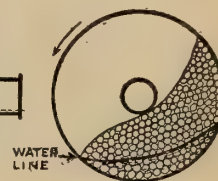
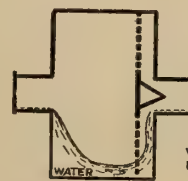
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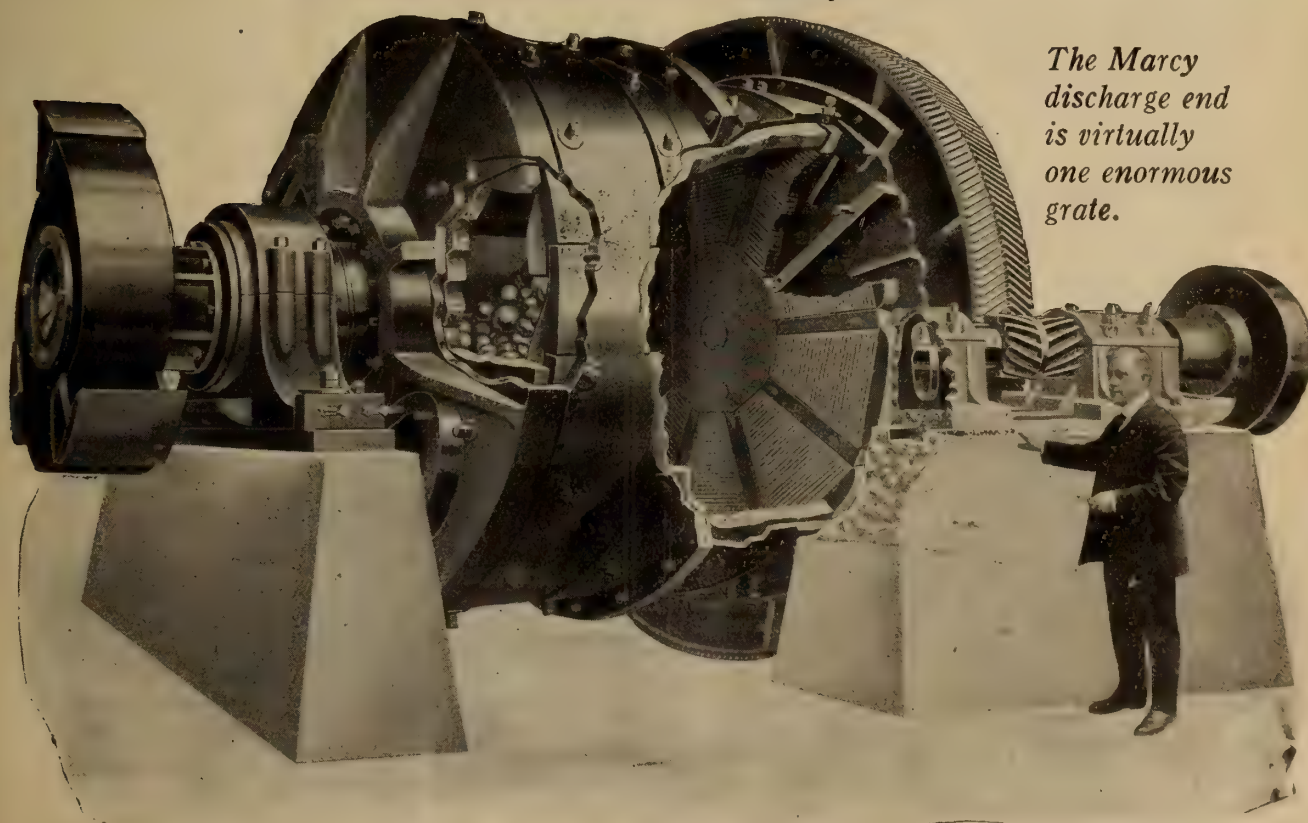
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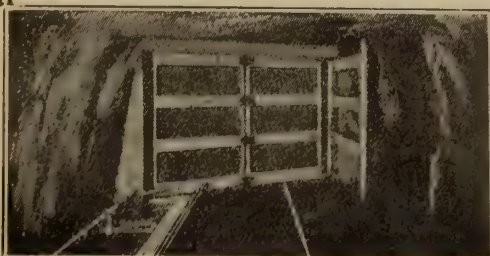
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, September 15th, 1918.

No. 18

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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There has just been published the report of the Department of Mines, of Quebec, on mining operations during 1917. A preliminary report by Mr. Denis, published in March, gave a summary of the production during 1917. The report includes information on asbestos, copper and sulphur ores, iron, chromite, zinc, lead, molybdenite, gold, silver, magnesia, mica, kaolin, antimony, graphite, mineral paints, building materials, silica, peat and coal. Particularly interesting and useful are the accounts of development of "war minerals." Quebec has important deposits of chromite, molybdenite, magnesite and pyrites, and these deposits are being worked very successfully, and Quebec is making an important contribution of minerals for munitions.

The Department of Mines has just published two reports that will be of special interest to those engaged in developing mineral resources of Northern Manitoba. Memoir 105; The Amisk-Athapapuskow Lake District, by E. L. Bruce, and the Summary Report, 1917, Part D, by E. L. Bruce, F. J. Alcock, J. R. Marshall and W. A. Johnston, are full of information on the mineral resources of Manitoba.

THE ADVISORY COUNCIL'S REPORT.

There has recently been much talk over proposals to establish in Canada, institutes like the Mellon Institute of Pittsburgh and the Bureau of Standards, Washington. There can be no doubt that these institutes are doing very valuable work in the United States and that we should have had similar ones here years ago.

Approval of the proposal to establish a central research institute in Canada is contained in the report of the Advisory Council for Scientific and Industrial Research just published. According to the press despatch which contains this announcement, the Advisory Council has discussed the matter at great length for the last nine months and the chairman has, on several occasions, consulted collectively and individually the heads of the various technical bureaux in Washington on the subject and a majority of the members of the Council visited Washington to discuss the matter.

Apparently the Advisory Council has profited by its own preaching. When first appointed, some of the members took great delight in talking about subjects of which they obviously knew little. If they had had the good sense to consult the technical heads of Canadian bureaux, as they have since done, those of Washington, they would probably not have been so careless in their statements. Fortunately, they were correct in their main argument: that Canada will benefit by paying more attention to the application of research to industry. They have themselves demonstrated that research is good for Advisory Councils.

The Advisory Council has important work to do and it has the assistance of men who can do good work. If the Council has the ability to use to any appreciable extent the volunteer service that is represented on its various advisory committees, it should be an important factor in industrial development. While we have not been able to give the Advisory Council any great praise for its statements concerning industrial research in Canada, we still have hopes that it may eventually fill the place it occupies. If it can carry on a successful campaign for the establishment in Canada of research bureaux it will deserve our thanks, particularly if it can do so without spreading misinformation concerning the mining and metallurgical industries.

The Advisory Council, if we may judge from the publicity given to the subject, evidently considers its most important accomplishment to be the exploitation of the lignite deposits of Saskatchewan. On the advice of the Council, the Dominion Government and the Governments of Manitoba and Saskatchewan are spending a large sum of money on an experimental briquetting plant at Estevan, Manitoba. If this plant proves to be a commercial success the Council, together with the Commission of Conservation which has advocated the

briquetting of the lignites, and the Department of Mines, which did most of the experimental work, some of it years ago, will have been of great help in providing local fuel for the Prairie Provinces.

An objectionable feature of the publicity in connection with this experiment has been the failure to give proper consideration to the coals of western Alberta. Judging by newspaper comments, the continual comparing of lignite of Saskatchewan with coals from the Eastern United States has led the public to believe that there is not in Western Canada any satisfactory substitute for the American coals now imported. It cannot be too often emphasized that the main reason that so little of the high grade coal of Alberta has been sold in Manitoba is that the railways charge a much higher freight rate on Canadian coal coming east than on American coal going west. The preference given to American coal by the railways is a natural result of the heavy movement of grain to the east, and it may be that the rate is a reasonable one. The matter of freight rates needs investigation. Any proposal to substitute Canadian coal for American coal in Manitoba should include careful consideration of the fact that there is plenty of good coal in Alberta. We are not satisfied that Alberta coal is being properly utilized in the Prairie Provinces.

The lignites of Saskatchewan may be utilized to better advantage than at present by carbonizing and briquetting them, as will be done at Estevan; but it will be regrettable if the Government considers that this experimental work on briquetting lignites relieves it from the necessity of inquiring into the reasons why our better grade fuels are not utilized.

The Advisory Council has also interested itself in certain investigations into the use of tar fog and some time ago engaged the services of a gentleman who has been making special researches. Important results are said to have been obtained. This may prove to be an important contribution to our coal distillation and metallurgical industries.

Investigations which may prove of value to industries other than mining include: utilization of heat and light from waste straw; fog signalling; sulphite liquor waste; rust-resisting wheat, etc.

Of interest to all industries are the activities of the Council towards providing better facilities for, and greater interest in, industrial and scientific research. The chairman, Dr. A. B. Macallum, says:

"This question is one of paramount importance to Canada in view of the intensified application of science to industry which elsewhere will be fostered after the war by the State and also through private enterprise. It has been ascertained that not two per cent. of Canadian industrial concerns have research laboratories, and only about ten per cent. have routing laboratories, chiefly for the elementary testing of materials.

"The provision for research, either in pure science or in science applied to industry, has been and is utterly inadequate to our needs, and unless vigorous action be taken, and soon, to re-organize our industries on scien-

tific lines wherever possible, Canada will face a very serious industrial crisis in the years following the war. The annual budget of the Massachusetts Institute of Technology exceeds the total of the annual expenditure of all the Faculties of Applied Science in Canada."

In connection with the proposal to establish a Central Research Institute, Dr. Macallum says:

"The work of the proposed institute would powerfully aid the development of scientific industrial research in Canada by stimulating the Canadian universities to increase their resources and facilities for research and thereby to direct into the ranks of science the ablest of their young graduates desirous of qualifying for a career, whether in pure science or in science applied to Canadian industry. It would place at the service of Canadian industry a factor which would insure its success in the strenuous international trade competition which is near at hand. It would, above all, enable the nation to direct its energy towards the economic and right utilization of its untouched stores of national wealth, in order that it may bear, with some degree of ease, in this and the next generation, the almost Atlantean financial burden it is assuming as a result of its playing its part in the present world struggle."

This statement of the work of the proposed institute should attract the attention of men in all our industries. Such an institute would undoubtedly be of great value to the mining and metallurgical industries of this country, and those engaged in these industries will do well to interest themselves in the proposals of the Advisory Council. We have not yet seen a copy of the complete report; but we understand that it is proposed to have, in connection with the Institute, laboratories at the disposal of associations which may be founded by the various industries, so that there may be co-operation in investigating problems that individual companies do not feel justified in tackling. Such laboratories would undoubtedly be an assistance in solving some of our problems.

From the report of the Advisory Council, we judge that it is recognized that we need researchers even more than we need laboratories and institutes. This is undoubtedly true. May we, however, be allowed to suggest that our industries are not yet using to advantage the research material that is available. There have been more embryo researchers turned out by Canadian institutions than have been absorbed by Canadian industries. The reason is obvious; the opportunities of making a decent living by scientific work in Canada have been too few. Our Government and our industries have now in their employ more highly qualified scientific men than they deserve to have. Inadequate salaries for scientific work are the rule in this country, and the consequence is that many, though, fortunately, not so many as might be expected, scientifically trained men go into other work or to other countries. In granting inadequate salaries to scientifically trained men, our Governments lead the way. Is it to be wondered at that researchers are scarce in this country, when we

find the Civil Service Commission advertising, as it did recently, for a scientifically trained man for the Mines Department at a salary of \$1,600 per year? Are the policies of the Government as exemplified by the Civil Service Commission and the Advisory Council in harmony? Is a Government that is unwilling to pay adequate salaries to technical men justified in encouraging young men to spend years and money in acquiring advanced technical education, if they intend to live and work in Canada?

VIEWS ON ORIENTAL LABOR FOR COAL MINES.

In official, political and Labor circles throughout British Columbia, the recent declaration of Hon. Frank Carvell, Canadian Minister of Public Works, that Asiatic labor must be imported for Canadian coal mines, if the fuel required for the absolute necessities of Canada cannot otherwise be produced, has occasioned much comment. The suggestion that Orientals should be given access to Western Canada without restriction meets with general opposition and any step having in view their employment in mines in larger numbers than at present would meet with vigorous opposition, not only on the part of the miners' unions, but by every branch of organized labor. The Press also opposes the idea, with the single qualification that it might be forced by famine. One of the leading journals of the province refers to the matter in the following terms:—

"The Minister of Public Works may not understand all the objections to the policy he proposes. His conditional plan would find the strongest opposition in the province which is best acquainted with Oriental problems. Nevertheless the statement of Mr. Carvell will have strong support among the people, if they find a coal famine upon them. Fuel must be provided, and in the last emergency the Government would undoubtedly call on Asia or any other country for help. But the last emergency has not yet arrived and it should not be too late to avert it by other means."

THE SEARCH FOR PLATINUM IN BRITISH COLUMBIA.

Mr. G. C. Mackenzie, of the Canadian Department of Mines, has made an interesting statement of the work under way in British Columbia in the line of prospecting for and developing minerals urgently needed by the Munition Resources Commission of Canada for war purposes.

The opening up of platinum ground was first undertaken. Mr. Mackenzie took a light prospecting outfit into the Tulameen River district, this consisting chiefly of three Empire drills. While no holes have been driven as yet, some gravel has been washed and it has been established that platinum can be obtained. The party traveled up and down the river, visiting many claims being operated by individuals, all of whom were taking out platinum and gold and all of whom appeared to be making wages. Promises were secured in every instance that clean-ups from these claims would be taken either to the Bank of Montreal or the Bank of Commerce at Princeton, B.C., whence the mineral will be forwarded to the Dominion Assay Office, Vancouver, B.C. for treatment.

Mr. Mackenzie says, in this connection, that the refinery for the handling of platinum and gold, which is being installed at the Vancouver Assay Office, is about complete and that it will be prepared to take all the

platinum, with or without gold, that may be offered, paying the market price for the latter and \$105 an ounce for the former. The prices offered for paladium, iridium and osmiridium have not yet been decided, but quotations have been cabled for and will be known in a short time.

On behalf of the Dominion Government, Mr. Tomlinson is touring British Columbia, at present being in the Kootenay districts. He is sampling all ground reported to contain platinum and, in brief, carrying out a thorough investigation in order that no other real source of supply may be overlooked.

Rich Molybdenite Ore From Taylor Mine.

Some time ago there was shipped from the Taylor molybdenite mine, near Renfrew, what is perhaps the richest car of molybdenite ore ever treated in Canada. Sampling and concentration results on this shipment show that it averaged over 6 per cent. MoS_2 . According to Mr. Taylor, who owns and operates the mine, only a small part of the shipment was hand-picked ore.

The market for molybdenite has recently been poor, as the United States dealers have not shown any anxiety to obtain supplies. Most of the molybdenite produced in North America is manufactured into ferro-molybdenum in the United States and exported to Europe.

The detailed report on the sampling and concentration of the carload of Taylor mine ore recently treated at Ottawa, show that it contained 141.5 lb. flake, containing 89.2% MoS_2 , and 49,937 lb. ore and fines containing 6% MoS_2 , or a total of 3,122.4 lb. MoS_2 . The recovery was 92%, or 2,872.65 lb. MoS_2 .

DEVELOPING COPPER MOUNTAIN.

The Canada Copper Corporation is making very satisfactory progress in the development of its immense deposits of low-grade copper at Copper Mountain, and should be in a position to commence production on a large scale at an early date. It is estimated that before work starts in the actual taking out of ore, the company will have expended \$3,000,000. Miles of road for the use of wagons and automobile trucks have been built to the mill site, situated four miles from Princeton, B.C., and a saw-mill, capable of cutting between 16,000 and 18,000 feet a day has been installed. Some excavating has been done for foundations to sustain the concentrating plant, capacity 2,000 tons daily, and some of the timber that will enter into its construction has been prepared. The company has been engaged in the opening up of its Copper Mountain properties for seven or eight years.

DIRECTOR OF COAL OPERATIONS.

Ottawa, Sept. 13.—Charles A. Magrath, Fuel Controller, has been appointed Director of Coal Operations for Nova Scotia and New Brunswick. The powers given him are wide. He has power to make all necessary investigation and enquiries respecting wages, holidays, hours of labor, the utilization of labor to the best advantage, and respecting all other matters necessary to, and connected with, the cost of and production of coal and "the increase and continuance of such production in Nova Scotia and New Brunswick during the present war and for three months after the end of the war."

The Manufacture of Silica Brick*

By H. Le Chatelier and B. Bogitch

Silica brick are indispensable in the manufacture of steel because they alone are able to withstand the high temperature of regenerative furnaces. All attempts to replace silica brick by other refractory materials for this purpose have failed.

Before the war, silica brick employed in France came principally from abroad, for which reason, since the beginning of hostilities, certain French steel works have been seriously handicapped. Our attention was first directed to the question by Mr. Bied, Engineer of the Teil Works. With him, we began certain investigations, at first using our laboratory and the furnaces of neighboring steel works. The larger part of our experiments, however, have been made in the laboratory of the Faculty of Sciences at Sorbonne. For the heating of our samples, we are deeply obliged to MM. Charpy, Yeatmann and Guérineau. In undertaking these studies, our first aim has been to render assistance to French industry, by indicating, as precisely as possible, the necessary conditions for the manufacture of high-grade brick but at the same time we have intended to give an example of the manner in which scientific methods may be put to practical application in the solution of industrial problems. Although our work has been confined to samples of only a few grams, we are nevertheless convinced that our information can be directly utilized by brick works of which the output is measured in thousands of tons.

As to what are most important and necessary qualities of silica brick, if one were to ask the steel metallurgists, they would almost unanimously reply that there was only one, namely, that the brick should permit the greatest possible number of runs without necessity for repairing the furnace roofs; they might suggest 400 runs as a satisfactory figure. Durability, however, is not the only factor. The brick have to be transported from the factory to the steel works without being injured by the jar or by freezing; many otherwise satisfactory bricks will not satisfy this last condition. It is further necessary that the brick shall not be too expensive, in order not to add unnecessarily to the price of the manufactured steel. The fundamental requirements, therefore, are the following: (1) durability of the furnace; (2) durability in transport; (3) moderate price.

Considering first the subject of durability of furnaces, the processes by which furnace roofs are destroyed can be answered by the direct observation of those in charge of furnaces. Our inquiries along this line did not meet with great success; only two steel works, the Ruelle Foundry, and the Chaussade Works, have been able to give us precise information, but, unfortunately, contradictory. One of these works has assured us that the roofs of Martin furnaces are almost invariably destroyed by progressive decrepitation under the action of heat. The other works, on the contrary, has assured us that similar furnaces are destroyed almost exclusively by melting. The brick manufacturers, on the other hand, have given us still a third reason, the ignorance or negligence of those in charge of the construction and operation of the furnaces. The engineer may have designed the profile of the furnace badly, not placing his burners in the most desirable place, or applying the first heat of the furnace too abruptly. The builder may have erred in shaping his bricks care-

lessly and laying them irregularly, so as to produce local pressure sufficient to occasion rupture. Above all, the heat may melt the roof of the best furnace, sometimes in a few hours, if the gas is badly regulated or if the reversals of flame are at too long intervals. From the discussion of this contradictory information and from suggestions found in different foreign publications, we have arrived at the provisional conclusion that the destruction of the roofs of steel furnaces may arise from five possible different causes, ranking in the following order of diminishing importance:

Causes of Failure of Furnace Roofs.

1. Superficial spalling of the brick under the influence of the highest temperatures developed in the furnace. This phenomenon is often noticed in the form of a continuous rain of little fragments, the falling of which may, after a few days, lead to the entire disappearance of the brick. This phenomenon depends upon two properties of the brick: Expansion of silica under high temperatures, and lack of mechanical strength at high temperature.

2. Superficial melting of the brick. Brick always melts superficially and continuously under the action of the spattering slag; this normal destruction of brick may continue for several months before leading to an actual cavity in the roof. Often, however, the brick will melt at once for a considerable width, several centimetres at a time, by which means the normal destruction of the brick may be multiplied by ten or more. This phenomenon depends upon the fusibility of the brick itself and upon its permeability, which facilitates the absorption of slag.

3. Flaking or shelling of the brick in the less intensely heated region. This begins to occur during the warming of the masonry, and below red temperature, and continues in the more remote parts after the furnace as a whole is considerably hotter. The brick, thus fractured, may then become detached and fall from the roof. This phenomenon is caused by the excessive dilation which is shown by all crystalline silicas at their temperatures of reversible transformation. Quartzose rocks decrepitate at a temperature of about 570 deg.; cristobalite, around 230 deg., undergoes an abrupt change in dimensions, of very important character; tridymite, finally, at about 150 deg. undergoes a change of slight importance. This tendency to rupture is offset by mechanical resistance of the brick and by its structure, that is to say, by the size of its grain and its amount of porosity.

4. Dislocation of the roof by excessive expansion. In furnaces made of silica brick, the roof always rises more or less when the furnace is first put into operation; this rising often becomes excessive and very irregular from point to point, which then leads to the falling in of the roof. This dislocation results, the same as spalling, from expansion of silica. If the brick is sufficiently resistant, and is heated over a considerable width all at once, it does not spall, but causes the roof to rise.

5. Collapse of the roof. The frequency of this accident with clay, magnesia, and alumina brick, makes it impossible to use these materials for the construction of the roofs of furnaces intended to maintain very high temperatures. Collapse will also occur, but very rarely, in furnaces made of silica brick. Collapsing results

from the softening that precedes fusion and, therefore, depends upon the same factors as fusibility. It is very rare in silica brick, being counterbalanced by the expansion of the quartz resulting from its transformation into silica of low density.

The reasons for the destruction of furnace roofs, and the properties of the brick upon which these depend, can now be tabulated as follows:—

Causes of Destruction.

1. Spalling.
2. Fusion.
3. Flaking or shelling.
4. Dislocation of the roof.
5. Collapse.

Properties of Brick.

1. Fusibility.
2. Compressive strength at high temperatures.
3. Permeability.
4. Expansion.
5. Dilation.
6. Compressive strength at ordinary temperatures.

It would be hazardous to assert that this list is absolutely complete, but if any phenomenon has been omitted, it is for the engineers of steel works to inform us.

Quartz is the universal raw material for the manufacture of silica brick. Deposits of quartz can be grouped into four distinct classes: Quartz veins, quartzite, sandstone and sand.

Most factories employ quartzite containing not more than 3 per cent. of basic oxides, and mix with it 2 per cent. of lime. The crushing of the rock is conducted in such manner as to preserve a number of large grains, having a maximum size of between 5 and 10 mm. The firing is performed at a high temperature, much above that employed in the manufacture of clay brick, and is maintained for a much longer period. This temperature may vary from 1,350 deg. to 1,450 deg., according to the nature of the quartz and the ease of its transformation. Firing progressively reduces the density of the silica; quartz transforms first into cristobalite and finally into tridymite, as one of us has shown 25 years ago. These are the basic facts upon which our researches were conducted.

Why Silica Brick Retains Rigidity at High Temperatures.

Before attacking the problem of the manufacture of silica brick, we have sought to answer an allied problem: Is it possible to find certain measurable properties of refractory products which will explain the superiority of silica over clay, alumina, and magnesia? An exact knowledge of the reason for the superiority of silica brick would certainly be a valuable guide to determine what properties are the most important to develop in the manufacture of refractory materials.

From our experiments, it is apparent that at 1,600 deg., which is still 100 deg. below the temperature of the Siemens-Martin furnace, silica brick has a compressive strength very much higher than that of the other refractory products. Furthermore, a factor which is of no less importance, the silica brick broke abruptly at all temperatures; they did not register any progressive deformation before rupture. With clay and magnesia brick, on the other hand, the observations were entirely different.

This ability of silica brick to preserve their rigidity at the very highest temperatures explains their superiority for furnace manufacture. As a means of reducing

this factor to its simplest terms, we began with an examination, under polarized light, of thin sections cut from bricks of good quality, one marked "American Star" and the other marked "Imphy," these being the two bricks which showed the highest compressive resistance at 1,600 deg., namely 30 and 40 kg. per sq. cm. They were composed of large, easily-recognizable grains of the original siliceous rock, completely transformed into cristobalite and surrounded by a magma formed of little, elongated crystals of tridymite.

The rigidity of the brick was evidently due to the crystallization of tridymite, which forms a continuous network, in the meshes of which the fusible silicates are lodged. The presence of these latter materials does not detract from the solidity of the mass any more than water in the cells of pumice stone would diminish its strength; in both cases, the solid network is unbroken.

In magnesia brick, on the contrary, and also in clay brick, at least in those manufactured under ordinary conditions, this recrystallization does not occur. The slightly fusible material, magnesia, forms isolated grains which are surrounded, at ordinary temperatures, by a magma of very solid silicates; the latter, however, melt at around 1,300 deg., if ferruginous, or at about 1,500 deg., if purely magnesian. Above these temperatures, therefore, the solid grains swim in a melted mass and can slide on one another, the more fluid the magma, the more readily they slide.

The formation of this continuous network of silica is exactly parallel to the phenomenon observed in the hardening of cement. A mixture originally consisting of isolated grains, when tempered with water, is progressively transformed by chemical reaction into a coherent mass. In the same manner, the isolated grains of quartz in a brick become set on contact with melted silicates, which operate as solvent.

Quartz is unstable at temperatures above 800 deg., but, owing to its remarkable passive resistance, it is able to remain for a long time in that condition at very high temperatures, even up to 1,600 deg. If it is then brought into contact with a solvent, melted silicates, for example, it dissolves in that with a readiness very much greater than that of the more stable forms of silica, cristobalite and tridymite. This is due to the unanswerable and thoroughly established laws of physical chemistry. The quartz thus gives rise to super-saturated solution, from which one of the more stable varieties soon begins to crystallize. The melted mass, now being no longer saturated with respect to quartz, is able to dissolve additional quantities of it. Gradually, therefore, the entire amount of quartz recrystallizes into the variety that is most stable at high temperatures, tridymite. In practice, if the firing of silica brick has not been sufficiently long, the proportion of cristobalite, and sometimes even of quartz, is greater than that of tridymite in the finished product, if of poor grade. Burning for almost a month at the highest temperature of the steel furnace is necessary to transform silica completely into tridymite. The crystals of tridymite thus formed by solution attach themselves to one another, as is always the case under similar conditions, and form the network above mentioned.

Quality of the Brick.

This explanation for the superiority of silica brick gave rise to the question whether variations in quality were not exactly parallel to the compressive strength at high temperatures. To settle this question, we re-

quested, from different steel works, samples of brick which had been used for the construction of furnaces, as to the relative quality of which they were able to advise us. The Ruelle and the Guerigny Works sent us well classified series of samples upon which we made tests giving the results shown in Table 3. The tests on compressive strength at high temperatures were made, with some samples as soon as 1,600 deg. had been reached, while with other samples only after they had been maintained at this temperature for one hour. We realized that these two methods of proceeding might give different results in some cases. At the same time, we made determinations of a number of other physical properties, such as absolute density, apparent density, weight of sulphate corresponding to basic oxides present, and finally compressive resistance at ordinary temperatures.

All of the good bricks, after being held at 1,600 deg. for one hour, showed a compressive strength greater than 10 kg. per sq. cm.; most of the good bricks exceeded 20 kg., while the poor bricks were below 5 kg. It seems evident, therefore, that rigidity at high temperatures is the most essential, if not the only important, quality of silica brick. Most of the good bricks have densities below 2.40, the very good ones being as low as 2.33. The amount of sulphate in good bricks is below 15 per cent.

Manufacturing Operations.

Selection of the Quartz.—The proportion of basic oxides should not exceed 3 per cent., which is equivalent to 10 per cent. of sulphate, if excessive fusibility is to be avoided. On the other hand, the percentage of impurity should not be below 1.5 per cent. to avoid the necessity for excessively high temperatures in order to cause complete transformation of quartz. An average of 2 per cent. of basic oxides represents good practice throughout the world.

Certain quartzes fall to powder during calcination and naturally cannot yield other than very ordinary brick; the large grains, the importance of which has been noted above, disappear during this operation. This fault is easily detected by a rapid heating to between 1,500 deg. and 1,600 deg., sufficient to cause transformation of the quartz into silica of low tensity.

Rocks of great hardness increase the expense of crushing; while, on the other hand, a rock that is too soft makes it difficult to obtain large grains, and especially those of angular shape. For this reason, true quartzites are generally preferred to sandstone, although the latter can be crushed more cheaply. In England, however, the Sheffield ganister, which has a very high reputation for the manufacture of silica brick, is a true sandstone.

Sands are the worst of all natural quartz materials for this purpose, on account of the fineness, the rounded outline, and especially the uniformity in size of their grains.

Crushing.—The crushing of quartz is always an expensive operation on account of the hardness of the material; it requires the expenditure of considerable energy and leads to a rapid wear of the crushing apparatus. Roller mills are most commonly applied, the operation being continued until the desired degree of fineness is obtained. This does not seem a rational method, because the relative proportion of the different sizes of material cannot be accurately regulated.

To obtain the larger grains, there is no reason for using roller mills, and it is preferable to use some form

of cylindrical crusher, requiring much less mechanical energy, and also yielding grains having a lammelar shape, which is most advantageous for the compactness of the brick.

If roller mills must be used, however, it is necessary to give them a sufficient weight, 5 tons at least, in order to enable them easily to crush fragments of quartz of the size usually delivered by the jaw crusher. If the roller mills are too light, they roll over the grains without crushing them, increasing greatly the cost of power and repairs, while also introducing particles of iron into the mixture, which later give rise to brown stains on the brick, after firing.

Addition of Fluxes.—Lime is the only flux regularly employed by manufacturers of silica brick; the proportion is generally between 1 and 2 per cent. M. Bied has proposed to add to the lime either oxide of iron or alkali. The advantage of a flux containing oxide of iron is that silica is only slightly soluble in it at high temperatures, and, therefore, the tridymite network is less rapidly destroyed than in other fluxes. In Martin furnaces, the bricks of the roof are often impregnated with oxide of iron to a depth of 10 cm. without seriously diminishing their resistance to heat.

The chemical composition of the fluxes is not the only important point; it is necessary to reduce them to a sufficiently fine state of division to allow them to mix intimately with the silica; this is the more important in proportion to the amount of impalpable silica in the mixture.

Wetting the Mixture.—The proportion of water added for the purpose of making the mixture workable should be enough to permit the brick to be carried to the dry house without danger of deformation. The quantity may vary from 8 to 16 per cent., according to the proportion of impalpable material; obviously, the larger the proportion of extremely fine grains, the more water is required.

Mixing.—Mixing, for the purpose of distributing the flux uniformly throughout the siliceous mass, is the more necessary according to the proportions of fine material. We have not yet found a perfectly satisfactory process for controlling the distribution of lime throughout the mixture, although this is a very important factor determining the quality of the brick. Inasmuch as the mixing operation is not very expensive, it would be much better to increase the length of the mixing process, even beyond what would appear to be strictly necessary. The operation is generally conducted in light mills revolving rapidly.

Molding.—Molding of the bricks is most often performed by hand, although there is some doubt as to whether this process is better than the use of a molding press. It permits, possibly, a more regular distribution of the mixture in the molds, and yields brick which, at 1,600 deg., possess the same mechanical strength as machine-pressed brick. In the case of a badly-fired brick, the final expansion, which occurs after the bricks are in the furnace roof, has better opportunity to relieve itself in the spaces of a very porous brick and thus produces much less external pressure. On the other hand, pressed brick, which are always dense and have greater strength at ordinary temperature, are much less permeable to the slag; this is important, as this permeability is an important factor in the destruction of brick. It would seem, finally, that for careful manufacture, high molding pressures are preferable, al-

though for second-quality brick, hand molding may be perfectly suitable.

Drying.—The molded brick must be dried before they are introduced into the kiln because they would otherwise be too soft to permit them to be piled one on another the abrupt application of heat, furthermore, would cause them to burst or at least crack by too rapid expelling of excessive water vapor.

The drying operation presents no difficulties and requires no special precaution. It is possible, immediately after molding, to put the bricks into a heated stove and dry them in a few hours. In this respect, silica bricks differ from clay bricks in that drying does not produce any contraction. With bricks containing a large amount of impalpable silica, the operation may require more care, but is never difficult.

Firing.—Firing is the most important feature in the manufacture of silica brick, and also the most expensive; unfortunately, the best conditions for firing are not yet fully understood. Tests are difficult to make on account of the length of firing and the dimensions of the furnace in which firing is done; firing often lasts for twenty days and may take place in a furnace holding 200 to 300 tons of brick at once.

The maximum temperature of firing is often considerably exaggerated. We often hear of firing temperatures of 1,500 deg. and even 1,600 deg., but we do not believe that any silica brick are ever actually fired at temperatures exceeding 1,400 deg.

In addition to the temperature, it is necessary to take into account the length of time during which the maximum temperature is maintained, and also the rapidity with which the heating is conducted. In case of too rapid a heating, the brick expands enormously, the direct transformation of the grains having preceded the formation of the network. From the theoretical point of view, it would seem that the best condition of firing would be to raise the bricks as rapidly as possible to the temperature at which the large quartz grains begin to transform directly, but slowly; this would give the network of tridymite an opportunity to develop more rapidly than the isolated grains transform, which is indispensable in order to limit expansion. This temperature would then be maintained a sufficiently long time to allow the transformation of large grains to be completed.

We should mention an absolutely contrary theory maintained by certain manufacturers on account of its economical advantages. This involves firing at a very low temperature, in order to form the indispensable network, but allowing the grains of quartz to remain untransformed; the final heating is afterward finished in the steel furnace. This process has the advantage of not introducing cristobalite into the brick and thereby diminishing the danger of fracture; on the other hand, at high temperatures, brick of this character would be subject to considerable expansion, leading to a warping of the furnace roof. If, however, the proportion of impalpable silica has been sufficient, and if the firing has been sufficiently prolonged, the tridymite network may perhaps be sufficiently solid to offset the danger of expansion.

We should also mention a third theory, upheld by certain American authors; well-burned bricks are good; slightly-burned bricks are mediocre; but medium-burned bricks are composed principally of cristobalite and disintegrate into large fragments by fracturing.

WILL CONTROL STEEL OUTPUT.

Ottawa, Sept. 4.—The details of an order-in-council enlarging the powers of the War Trade Board insofar as the production, distribution and consumption of steel are concerned, made available this evening, show that this step has been taken because the Government has decided that it is impossible to sufficiently augment supplies by importation.

The order empowers the War Trade Board to make such orders as may be deemed advisable to increase the production of iron and steel and the goods and articles made from steel. In cases where such production cannot be secured without the Government placing orders and giving assistance, orders of the War Trade Board shall first be approved by the Governor-in-council.

The War Trade Board is given authority to employ engineers, steel experts, inspectors, accountants and other assistance necessary to effectively control the steel industry.

Producers and manufacturers of iron and steel who fail to carry out the orders of the War Trade Board shall be subject to a penalty of not less than \$500 and not more than \$5,000, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment.

The order emphasizes the fact that there is a serious shortage of steel, not only in Canada, but in the allied countries, and states that "the railways, transportation companies and other industries necessary to Canada are in danger of being greatly curtailed or seriously crippled through want of steel."

U. S. GETS TIN.

Washington, Sept. 11.—Two-thirds of the pig-tin supply of the world is to be received by the United States under a pooling arrangement made at a recent conference in London between representatives of this country, Great Britain, France and Italy.

This was announced by the War Industries Board, which said that all shipments of pig tin and tin ores to this country would be consigned to the American Iron and Steel Institute, which will distribute it at regular prices. Quotations of pig tin already have fallen 14c. a pound.

THE INSTITUTE OF METALS.

The autumn meeting of the Institute of Metals, London, was held on September 10th. The subjects discussed included:

"Effect of progressive cold work upon the tensile properties of pure copper," by N. E. Alkins (Manchester).

"The resistance of metals to penetration under impact," by C. A. Edwards (Manchester).

"Grain growth in metals," by Z. Zeffries (Cleveland, Ohio).

"Rapid recrystallization in deformed non-ferrous metals," by D. Hanson (Teddington).

"Influence of impurities on mechanical properties of Admiralty gunmetal," by F. Johnson (Birmingham).

"Rapid estimation of phosphorous in bronze," by T. E. Rooney (Teddington).

"Disintegration of a copper-aluminum alloy," by R. Sligman and P. Williams.

"Annealing cold, rolled aluminum sheet," by R. J. Anderson (Cleveland, Ohio).

"Mechanical properties of alloys of copper and zinc," by F. Johnson (Birmingham).

"Liquid fuel in the foundry," by Capt. A. E. Plant.

FERROMOLYBDENUM.*

By R. M. Keeney.

The use of ferromolybdenum in the metallurgy of steel is in its infancy. Previous to 1914, probably not over 10 tons was produced yearly in the United States, practically all of this being exported; but with the high price of tungsten, search for molybdenum ores became more active, and now several hundred tons per year are made in the United States, practically all of which is exported. The alloy has not been widely used because of the supposed scarcity of ore, and the prejudices of American steel manufacturers against it, owing to difficulties encountered in its use in steel. The scarcity of ore has been overcome, and at present Colorado is the largest producer of molybdenum in the world. The prejudices of American steel manufacturers have not, however, been overcome.

Ferromolybdenum was made from roasted molybdenite in the crucible before the introduction of the electric furnace, but can now be made directly from raw sulphide in the electric furnace. Another source of molybdenum is lead molybdate, wulfenite, which is fused with soda ash and carbon to produce lead bullion and sodium molybdate slag. The slag is then smelted in the electric furnace, with carbon as a reducing agent, and suitable fluxes, to produce ferromolybdenum.

The standard grade of ferromolybdenum is not well established. Some manufacturers make a product containing 50 to 80 per cent. molybdenum and 3 per cent. carbon and manage to sell it. Others, by different methods, make a product containing less than 1 per cent. carbon. A great deal of ferromolybdenum containing 0.25 per cent. sulphur has been sold but most consumers will not accept a product containing over 0.1 per cent. sulphur. Ferromolybdenum containing 80 per cent. molybdenum has a dull gray iron color, coarse structure, high density, and is non-magnetic. It does not break easily.

Raw materials used in preparation of ferromolybdenum may be: for ore, the sulphide, molybdenite, or sodium molybdate slag made from wulfenite; for reducing agent, some form of carbon, or 90 per cent. silicon metal ground to pass 60 mesh; for fluxes, lime and fluorspar. There are two methods of manufacture:

1. Reduction with carbon and excess of lime, according to the reaction:

$2\text{MoS}_2 + 2\text{CaO} + 3\text{C} = 2\text{Mo} + 2\text{CaS} + 2\text{CO} + \text{CS}_2$
pure molybdenite contains 60 per cent. molybdenum and 40 per cent. sulphur. According to the above reaction, 100 parts of molybdenum are reduced from 170 parts of molybdenite by 18.8 parts of carbon. For every 100 parts of molybdenum, 58 parts of lime are necessary for slagging the sulphur as calcium sulphide. This reaction works out closely to the theoretical, and there is no difficulty in making a product with about 0.1 per cent. sulphur; the product will contain 1.3 to 3 per cent. carbon. If a lower-carbon alloy is desired, the crude metal is broken up and refined with an oxidizing slag of iron ore. The amount of iron in the alloy is varied as desired by the addition of iron turnings in the smelting furnace, or of iron oxide in the refining furnace.

2. Reduction with silicon metal, according to the reaction:



This method has been used recently in the production of 50 per cent. ferromolybdenum, although when this

grade is being made, ferrosilicon may be used. Lime is sometimes added to help slag the sulphur as calcium sulphide. By this method, the production of 100 parts of molybdenum requires 29 parts of silicon.

Ferromolybdenum containing 80 per cent. molybdenum and under 1 per cent. carbon cannot be regularly tapped from the electric furnace because of its high melting point, so that when this grade of alloy is to be made, the furnace must be of the knock-down variety, for removal of the button. The slag is tapped off, and when this operation is finished the metal is dug out. A 50 to 60 per cent., low-carbon product can be tapped, and a considerable quantity of this grade is made in tapping furnaces.

Molybdenum in Steel Manufacture.

Ferromolybdenum is added to steel as a fixed addition, nearly all of the molybdenum remaining in the steel. It is supposed to give the steel properties similar to those of tungsten steel, but only one-third to one-half as much molybdenum is necessary; that is, where regular high-speed steel contains 18 per cent. tungsten, 6 to 9 per cent. of molybdenum may be substituted. However, it gives these properties only when the addition is properly made and proper heat treatment follows. The regulation of these factors caused so much trouble and expense that, in this country, the manufacture of molybdenum high-speed tool steels has been practically discontinued for several years. It is used for this purpose abroad, however, to a considerable extent. At the present time, it is mainly employed in tool steel as an auxiliary rather than as a major constituent.

Various reasons have been assigned for the discontinuance of the use of molybdenum in these steels. Taylor found that molybdenum in rapid steels caused irregular performance; that steels of the same composition and having had seemingly the same treatment gave large variations in their maximum cutting speeds. One manufacturer has stated that the ingots crack in forging, the tools crack on quenching, and molybdenum appears to volatilize from the steel when heated; the latter might be due to the production of molybdenum oxide, which is much more volatile than the metal itself.

When small quantities of molybdenum, say 0.25 per cent., are added, the elongation and elastic limit of the steel are greatly increased. When molybdenum is combined with nickel, the resistance to shock is increased without diminishing the elongation. Its utilization for linings of big guns was originated by the Germans with such success that the Allies are said to use it now for the same purpose. This may account for the heavy exports of molybdenum.

HOOVER'S ESTIMATE FOR NEXT YEAR.

Mr. Herbert Hoover, of the American Food Administration, who visited England and France to confer with the Food Controllers of the Allies, says that this continent next year will have to supply the Allies with 4,000,000,000 pounds of fats, 900,000,000 pounds of beef products, 500,000,000 bushels of cereals, and 1,500,000 bushels of sugar. In addition to the former responsibilities overseas, next year there will be the feeding of an enormous American army in Europe.

"We have to make good," says Mr. Hoover. "We can do it, if we simply have the will to live with every economy, and waste nothing."

*Extracts from a paper presented at the Colorado meeting A.I.M.E., September, 1918.

ONTARIO'S METALLIFEROUS PRODUCTION FIRST HALF YEAR, 1918.

Returns received by the Ontario Bureau of Mines for the six months ended June 30th, 1918.

In the table given below, for purposes of comparison, the quantities and values are given for the corresponding period in 1917:

Summary of Production, First Six Months, 1918.

Product.	Quantity.		Value.	
	1917.	1918.	1917.	1918.
Gold (ounces)	228,673	229,421	\$4,586,941	\$4,648,164
Silver (ounces)	10,073,787	8,736,002	7,584,439	8,267,624
Cobalt, metallic (lbs.)	162,250	118,889	237,004	249,045
Nickel, metallic (lbs.)	45,864	208,802	19,073	83,332
Nickel oxide (lbs.)	5,495	21,768	1,648	5,551
Cobalt oxide (lbs.)	153,498	259,371	175,308	339,052
Other Cobalt and Nickel Compounds (lbs.)	122,076	222,039	15,879	27,505
Nickel in matte (tons)	20,230	21,393	10,115,000	12,385,950
Copper in matte (tons)	10,381	10,708	4,152,400	4,283,040
Copper ore (tons)	1,543	16	45,688	318
Iron ore (tons)	69,209	106,196	231,937	424,259
Pig iron (tons)	347,190	341,182	6,067,050	9,256,599
Molybdenite, concentrates (lbs.)	36,777	32,656	47,942	45,845
Lead, pig (lbs.)	912,934	776,711	114,953	66,630

Copper in matte was valued at 20 cents and nickel at 25 cents per pound in 1917. For 1918 the values have been placed at 20 and 30 cents per pound respectively.

Considering the handicaps under which gold miners are operating, a small increase in production, as compared with the first half of 1917, is a creditable showing. In the Porcupine camp, the Dome, Porcupine Crown, Porcupine V. N. T. and Schumacher have ceased milling operations. The Croesus in Munro Township, the Tough-Oakes at Kirkland Lake and St. Anthony at Sturgeon Lake are in the same category. This curtailment of output is offset by the new producers of gold, Lake Shore at Kirkland Lake and Davidson at Porcupine. The 40-ton mill of the Patricia Syndicate at Boston Creek started operating the latter part of June. A promising vein carrying gold telluride has been discovered on the Miller Independence at Boston Creek. Shaft sinking is proceeding, and arrangements made to increase the milling capacity at this property. Considerable activity at Boston Creek has resulted from these developments. In the new Matachewan camp, from the claims under option to the Nipissing Mining Co., some spectacular samples of gold ore have been secured. Diamond drilling on the Otisse claims is said to be producing satisfactory results. During the period the Porcupine camp produced 207,731 ounces of gold and Kirkland Lake 17,927. A total of 515,094 tons of ore was milled with a recovery in gold and silver valued at \$4,692,529.

Although shipments for the first half of 1918 were lower by 1,367,785 ounces than for the corresponding period of 1917, the value was \$683,185 greater, the average price of silver per ounce for the two periods being 92.8, as against 75.4 cents. Companies shipping over one-half million ounces are given in order: Nipissing, Mining Corporation, Kerr Lake, O'Brien, Buffalo, Coniagas and Temiskaming. New shippers this year include Edwards & Wright, Ltd., operating the old Green-Meehan mine; the Silver Eagle of Silver Centre;

the Keeley mine in South Lorrain, where a high-grade vein has been uncovered. There was also a clean-up by the Lumsden Mining Co. The National Mines, Ltd., recovered and treated tailings from Cross Lake that had been deposited there by the Old King Edward and Silver Cliff mines. The Mining Corporation of Canada is now treating a larger tonnage of slimes and tailings from Cobalt Lake in the new mill. Silver was recovered from gold ores to the extent of 47,427 ounces.

There were treated at Deloro, Thorold and Welland 2,659 tons of ore and concentrates, and 1,116 tons of residues with a recovery of 2,753,701 ounces of silver. In addition, cobalt and nickel were produced in metallic form, also as oxides and sulphates. The Deloro Smelting & Refining Company uses a considerable proportion of its output of metallic cobalt in the manufacture of "stellite" which contains about 55 per cent. of cobalt.

As a result of high mining costs, together with increased freight rates, except that of the nickel-copper ores, has become unprofitable. The only shipper was the Hudson Copper Co. at Havilah.

Increased Output of Nickel-Copper Matte.

Nickel-copper mining and smelting shows an increase in output. During the half year, 804,640 tons of ore was raised from the operating nickel-copper mines. Ore smelted was 717,119 tons, producing 40,178 tons of nickel-copper matte.

Pig Iron and Steel.

Pig iron produced in the half year shows little change in quantity, as compared with the corresponding period in 1917, but in value the increase is over 50 per cent. There were 75,716 tons of Ontario ore, and 601,751 tons of foreign ore smelted by the eight furnaces in blast. Steel produced in the period totaled 432,326 tons, worth \$13,739,602.

Molybdenite.

The production of molybdenite concentrates for the half year shows a small decline in quantity, but the value was nearly as great as in 1917.

Lead.

There was only one producer of lead ore in the province during the half year, the James Robertson Estate. Operations, both mining and smelting, are carried on at Galetta. The pig lead product is used by the company in Montreal.

BRITISH COLUMBIA COAL PRODUCTION.

The July tonnages for British Columbia collieries are most encouraging, as the figures show that the production is holding with the pace set at the beginning of the year and indicate that there is a good chance that the province will, when the statistics are compiled at the end of the twelvemonth, be found to have outstripped all previous records.

Following is the production of the various collieries for July:—

	Tons.
Crows Nest Pass Coal Co., Coal Creek	37,922
Crows Nest Pass Coal Co., Michel, B.C.	19,407
Corbin Coke & Coal Co., Corbin, B.C.	13,454
Middlesboro Collieries, Merritt, B.C.	7,988
Fleming Coal Co., Merritt, B.C.	3,504
Coalmont Colliery, Coalmont, B.C.	347
Princeton Colliery, Princeton, B.C.	3,145
Canadian Western Fuel Co., Nanaimo, B.C. ..	61,563
Canadian Collieries (D), Ltd., Comox, B.C. ...	46,698
Canadian Collieries (D), Ltd., Extension	18,650
Canadian Collieries (D), Ltd., South Wellington, B.C.	2,122
Pacific Coast Coal Mines, South Wellington, B.C.	6,775
Nanoose Colliery, South Wellington, B.C.	2,285
Granby Colliery, Cassidy's, B.C.	2,718

It will be noted that there are three mines on the producers' list which have not been there for some time. Two newly opened mines are the Canadian Collieries' mine at South Wellington, which has 2,122 tons to its credit, and the Granby Mine at Cassidy's, B.C., with a production of 2,718 tons. These, while comparatively small at present, will grow and, no doubt, will become a material factor in British Columbia's coal output. The Coalmont Colliery is the other new name on the list. Although it starts with the modest tonnage of 347 tons for the month, more may be expected of it in the near future.

COAL NOW \$9.50 PER TON AT VANCOUVER.

The price of domestic lump coal has been raised in Vancouver, B.C., from \$8.80 a ton to \$9.50 by most of the retail dealers. This increase, it is assumed, is the result of the recent action of the Canadian Fuel Controller in permitting certain of the Vancouver Island Collieries to raise their selling prices. The view taken by the Controller on the occasion in question was considered rather unusual, inasmuch as he authorized a maximum selling rate of \$6.55 a ton to all the Island mining companies, with the exception of the Canadian Western Fuel Co., which was not sanctioned to raise its quotations beyond the maximum which had previously prevailed, namely, \$5.80 a ton. The explanation given was that investigation had proved that, owing to circumstances over which they had no control, all other collieries were subject to greater production charges than the C. W. F. Co., and that the latter was the only one which was making what might be considered a fair profit on the capital investment. The Vancouver public, however, take the position that dealers handling C. W. F. coal, as well as others, have raised prices and that some must have gone beyond the power given them by the Controller when he set their maximum profits at 50 cents a ton. It is suggested that an investigation is in order.

MANGANESE ORE FROM KASLO, B.C.

Returns have been received from the Mines Branch, Ottawa, on several samples of manganese ore sent from the Kaslo, B.C., property for assay.

They follow:—

Sample No. 1.	
Loss on ignition	17.15
Manganese	51.45
Iron	6.17
Silica	7.32
Phosphorus	0.07
Sulphur	0.06

Sample No. 2.	
Loss on ignition	15.45
Manganese	52.42
Iron	5.22
Silica	7.30
Phosphorus	0.11
Sulphur	0.09

Sample No. 3.	
Loss on ignition	13.88
Manganese	59.97
Iron	0.88
Silica	2.30
Phosphorus	0.15
Sulphur	0.45

THE MANGANESE DISCOVERY IN COWICHAN DISTRICT, B.C.

With regard to the recent manganese discoveries in the Cowichan district, Vancouver Island, Mr. Geo. C. Mackenzie, who has just been to Victoria, returned from an inspection of one of these properties, which is situated on the summit of the Divide between the Che-mainus and Cowichan Rivers and within easy reach by aerial tramway of the Esquimalt & Nanaimo Railway, speaks very enthusiastically of its possibilities. Although no development work has been done, Mr. Mackenzie took samples from the surface which ran high in values. He states that there is a surface exposure 100 by 20 ft., which, allowing for a depth of 10 ft., a very conservative estimate, and figuring manganese at its present price of \$70 a ton f.o.b. Chicago, Ill., means that there is \$140,000 worth of ore immediately available. "I saw all the best manganese of Nova Scotia and New Brunswick last summer," Mr. Mackenzie declared, in giving his impression of this claim, "and I never saw anything better."

As it had been proposed importing ferro-manganese from India for use in the manufacture of munitions in Canada, Mr. Mackenzie thought that the location of these properties on Vancouver Island was of first importance. He thought it likely that the War Trade Board of Canada, in co-operation with the locators and owners, would arrange for their early development, in which event, owing to their accessibility, it would not be long before ore was being shipped.

How Manganese Was Found at Cowichan.

There is an interesting sidelight to the discovery of the manganese, the situation of which has been described. Its locator is Pte. Tom Service, who fought with an Engineers' Corps in France, and who had a part in the mining of Hill 60, which, as will be recalled by all who have followed the course of the war, was blown up by means of what was the greatest mine in history up to that time, a strong German fortress being literally obliterated. Service returned to Canada only a few weeks ago. He saw manganese samples from

another part of the Cowichan district and exclaimed that he knew where there was more of the same ore, and could find it without trouble. He went out, staked and recorded the claim in question and has named it "Hill 60." So there now is a "Hill 60" on Vancouver Island which gives promise of supplying quantities of the raw material for the production of munitions necessary to drive the Hun out of the fair lands he has invaded and devastated.

In the new bulletin K-303 issued by the Canadian Ingersoll-Rand Company, Limited, the class EL-2 two-stage, straight line air compressor is described. The bulletin indicates the advantages of the tandem arrangement for certain classes of work where economy of space is to be combined with the advantages of two-stage compression, and goes on to give details of construction, including the leaf valves and other features. The bulletin concludes with a note on the short-belt drive, with which this type of compressor can be furnished, and which has distinct advantages where space is at a premium.

The value of gold bullion deposited at the Dominion of Canada Assay Office, Vancouver, B.C., during the month of August, 1918, was \$608,838.43, which is an increase of \$253,845.88 over the same month of 1917. Most of this gold came from the Yukon.

B.C. Department of Mines Will Drill Iron Ore Deposits.

The establishment of an iron and steel industry in British Columbia is earnestly desired by the Provincial Government and, although no action of a definite character has followed the enactment at the last session of the Legislature granting a bounty of \$3 a ton on pig manufactured from local ore in British Columbia and \$1.50 a ton on pig manufactured from foreign ore in the province, Hon. Wm. Sloan, Minister of Mines, still looks forward confidently to the development of the country's magnetite deposits.

In a recent statement, the Minister said that the bounty did not seem, so far at any rate, to have had the desired effect. There had been enquiries regarding the iron ore resources of the province, it was true. Capitalists had shown some interest and still were doing so. Properties were being investigated by private interests, but, in spite of these gratifying indications, he was not satisfied.

In his opinion, there was an opportunity offering now for the establishment of an industry on the Pacific coast which would lead to the utilization of the magnetite of the province, as well as the material advancement of its commercial interests. Convinced that no time should be lost, and firmly of the belief that, with a proper realization of the resources of the country, capitalists would not hesitate to undertake development, Mr. Sloan declared that he had decided to diamond drill a number of the most promising properties for the purpose of gaining a definite idea of the tonnage available and also to give those interested a practical demonstration of the possibilities of the industry in question. His engineers had been carrying out investigations with this work in mind and properties had been selected. He, therefore, was able to announce that tenders would be called for at an early date for the diamond drilling of iron properties, and the work thereon would be proceeded with as expeditiously as possible in order that the desired information might be put before those who might be interested in the iron ore deposits of the province without loss of time.

PERSONAL

Mr. H. E. T. Haultain was large responsible for the excellent exhibit of Vocational Training for Returned Soldiers at the Toronto Exhibition. It was one of the most attractive and instructive exhibits on the grounds.

Mr. Mark Workman, president of the Dominion Steel Corporation, who has spent several days between Montreal and Ottawa, has returned to Sydney, where he will remain this month.

Mr. D. H. McDougall, president of the Nova Scotia Steel and Coal Company, is said to be identified with the development of mining areas at Beersville, Kent County, N.B.

Mr. C. A. Magrath, Fuel Controller, has been appointed Director of Coal Operations in Nova Scotia and New Brunswick.

Prof. S. F. Kirkpatrick, head of the Department of Metallurgy, at School of Mining, Kingston, is resigning. He is metallurgist for the Deloro Mining & Smelting Co.

Mr. J. B. Tyrrell is in Newfoundland. He is expected to return to Toronto in the latter part of September.

Mr. E. Jacobs is in Phoenix, Arizona.

Mr. W. R. Burge, of the Canadian Allis Chalmers, Ltd., has been promoted to the managership of the Ontario district office.

Mr. R. T. Regnall, formerly of the Dome Lake, has succeeded R. N. Palmer as underground superintendent at the Hollinger Consolidated.

Mr. R. Home Smith will be Ontario's new Fuel Commissioner, according to information received by The Globe recently. He will succeed Mr. R. C. Harris, City Works Commissioner. Assisting Mr. Smith, either as adviser to the Commissioner or as Deputy Fuel Controller, will be Mr. E. L. Cousins, Chief Engineer and Manager of the Toronto Harbor Commission, who has been long associated with Mr. Smith on the Harbor Commission.

Mr. J. C. Nichols and Mr. J. W. Rawlins, of Copper Cliff, are inspecting copper concentrating plants in Arizona.

Burnett & Crampton is a new firm of engineers and iron founders which has recently been established at Rigaud, Que. They have a very well equipped shop, capable of handling eight tons per day with a machine shop, pattern shop and blacksmith's outfit. Mr. Burnett was the electrical engineer for the Canada Cement Co., Ltd., and also has had considerable mechanical and foundry experience. Mr. P. P. Crampton is very well known to the mining industry through his previous connection with the Hull Iron & Steel Foundries, Ltd.

Mr. Oscar Lachmund has resigned his position as general manager of the Canada Copper Corporation, and will leave its employ this month. He is to be succeeded by Mr. H. R. Van Wagoner, of Denver, Colorado, who has been in British Columbia looking over the situation and is to return to take up his new duties in a few weeks.

The reinforced concrete cargo steamship "Faith," which left a California port some weeks ago for a west coast South American port, was, a few days ago, reported as having arrived safely and in first-class condition. The "Faith" is discharging her cargo of lumber and is expected to reload for an American port, which she will reach via the Panama Canal.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Cobalt Silver-Ore Shipments.

During the month of August twenty-eight car-loads of ore were shipped from the Cobalt camp. Thirteen mines were represented in the shipments, the aggregate weight of which was 2,063,554. The details of the month's shipments were as follows:—

Mine.	Lbs.
Buffalo	328,959
McKinley-Darragh	313,393
Nipissing	234,120
Dominion Reduction	231,400
LaRose	210,366
Coniagas	170,370
O'Brien	128,110
Kerr Lake	118,545
Trethewey	77,165
Hudson Bay	65,772
Penn-Canadian	64,688
National	60,665
Aladdin	60,000
Total	2,063,554

Hattie Gold.

According to advices received from Matheson, the development work under way at the Hattie Gold Mines is progressing favorably and giving satisfactory results. The new vein recently discovered has been sunk on for a depth of 25 feet, at which point it was found to be four feet in width. On the No. 2 vein, considerable trenching has been done and good ore and tellurides, as well as free gold, is in evidence for some distance. The company expect to have their new plant, which consists of an 80-h.p. boiler, with six-drill compressor and hoist, installed at an early date.

Gold Discovered in Bristol Township.

It is reported here that a rich discovery of gold has been made in Bristol Township, near the Ogden Township line. The story is to the effect that a vein 400 ft. long has been uncovered, and while the width of this vein has not been mentioned, channel assays are said to run up to \$1,700 in gold to the ton. In the early days of the camp, this township was well prospected and some fair showings were found. A number of prospectors have left for the district on the news of the recent discovery, and much activity is predicted for the district.

Matachewan.

A number of prospectors returning from the Fort Matachewan district recently brought out news of a rich gold discovery having been made on the claims being developed by the Nipissing Mining Company, of Cobalt. The specimens claimed to have been seen by these men are said to have been as rich as "Croesus ore." Captain H. L. Donaldson, who is in charge of the work at the property when questioned about the find, refused to give any information beyond stating that some gold had been uncovered. So far as known, no considerable quantity of ore has been found on this property.

Giroux Claims will be Developed.

The claims of Fred Giroux, situated in Lorraine Township, near Lake Latour, are to be operated; arrangements having already been made to begin the work. Some years ago a shaft was driven to a depth of 50 ft., and a crosscut commenced to cut the vein, which, on the surface, contained considerable native

silver and a large quantity of nicolite and smaltite. However, the vein was not reached before the work was discontinued. Local men, including J. J. Anderson, Gordon Cameron and George Watts, are parties to a lease of the property for two years on a fifty-fifty basis with the owner. It is proposed to cob out the high grade and ship it to Cobalt for treatment as the work proceeds.

Mining Corporation.

The production of over two million dollars worth of silver for the eight months of the current year just ended, by the Mining Corporation of Canada, means another exceedingly prosperous year for this company. This production is only about \$200,000 below the first nine months' period of 1917. This achievement is all the more remarkable when it is remembered that the company commenced the current year with estimated ore reserves of 1,500,000 ounces. This demonstrates the probability of all mines of the camp, where the ore reserves are substantial, finding their career lengthened to a considerable extent, as has been the case with the Mining Corporation. The treatment of approximately half a million tons of sands and slimes from previous operations of the company will probably add materially to the net income for the current year as a portion of the mill treating about 350 tons per day was placed in operation on this material the first week of the present month. It is proposed to gradually increase the capacity of this plant until between 650 and 700 tons per day are being handled. The slimes will be treated by cyanidation in the low-grade cyanide mill, while the sands will be re-ground and treated by oil flotation. The plant will be the largest of its kind in the Cobalt Camp when completed.

Gowganda.

Steady progress is being made at the Walsh property in Gowganda, which is being worked by the Crown Reserve Mining Company of Cobalt. Several weeks ago the announcement was made of the encountering of high-grade silver ore at the 100-ft. level of the property. Since this time the shaft has been sunk to the depth of 200 ft., a station cut, and cross-cutting is now under way to tap the vein at the 200-ft. level.

Ophir.

The announcement that the Mining Corporation of Canada has taken an option on the Ophir Mining Company's property in south-eastern Coleman Township has been the cause of considerable interest. The Ophir has been well known for years, and is one of the oldest mines in the Cobalt Camp. It is understood that under the arrangement, the Mining Corporation is to spend not less than \$2,500 per month on the property. The new operators took possession this week and are continuing the work of sinking the winze to the contact, which was under way by the original company. Where the vein left this working, it was wide and heavily mineralized. As soon as the contact is reached, a cross-cut will be run to encounter the vein. The strong financial position of the Mining Corporation assures the thorough exploration of the property.

Sinking a Shaft at Miller-Independence Mine.

The work of sinking the shaft at the Miller-Independence property to the 200-ft. level, and cross-cutting the vein at this depth is now under way and the next two weeks' developments at this property would appear to have a vital bearing on the future of the Boston Creek camp. The shaft is being sunk on the vein, keeping the hanging-wall side of the vein as one side of the shaft.

However, as the shaft is 7 ft. by 9 ft., the whole width of the vein is not being proven, and its exact width will not be known until the 200-ft. level is reached. From the surface to the 100-ft. level, the vein was determined to range in width from nine to twelve feet. With the shaft down 200 ft., and drifting both east and west at the 100 and 200 ft. levels, four faces will be available from which to draw ore for the enlarged mill to be placed in operation during the present month. A number of engineers have visited the property recently, and in each case where samples were taken for assaying, startling results were obtained. A large tonnage of rich ore has accumulated on the dump during the sinking of the shaft and it requires no searching whatever to pick out samples of ore containing large quantities of tellurides.

Elliott-Kirkland.

Plans are being made for the exploration of the Elliott-Kirkland property at depth by diamond drilling. The present workings have reached a depth of 500 ft., where considerable lateral work has been done. Although a characteristic mud-seam, along which ore deposition has been found to occur at other mines in the camp, is in evidence at the 500-ft. level of the Elliott-Kirkland, so far results met with have not been up to expectations. It has been discovered that the lamprophyre formation intruded from the north, where porphyry should occur, if geological conditions were ideal.

Ontario-Kirkland.

It is expected the plant of the Ontario-Kirkland mining company will be installed and ready for operation by November. In the meantime, work at the property is going ahead in a satisfactory manner. A large amount of building material is on hand, some of the buildings are up and the foundations for others are now being built. The Ontario-Kirkland was formerly known as the Hurd claim, and lies close to the producing mines of the camp. A number of large well-mineralized veins occur on the property.

Boston Creek.

The Mekks Syndicate, owning property near the Miller-Independence at Boston Creek, have made arrangements for the exploration of their property. This property is owned by Cobalt and Haileybury men. The name has been derived from the first letter of each of the owners' names.

McKinley-Darragh-Savage.

The McKinley-Darragh-Savage Mines has declared its regular dividend of three per cent., payable on October 1st to shareholders on record September 7th. This disbursement amounts to \$67,431, and makes 12 per cent., or \$269,724 paid during the current year. The McKinley-Darragh went on a dividend-paying basis in 1907, and since that time has paid a total of 241 per cent., or an aggregate amount of \$5,349,607, to the shareholders.

Altering Mill at Hill Gold Mine.

Alterations are being made to the mill of the Hill Gold Mines, near Painkiller Lake, in the Munroe district. The mill building is also being enlarged. In the meantime, underground operations have been suspended. Only a small number of men are employed at the property.

BRITISH COLUMBIA.

May Work Platinum and Gold Placers.

There is a prospect that the Peace River country, a large expanse of territory to the extreme north-east of the province of British Columbia, will become a platinum producer. A syndicate, at the head of which are

Dr. W. L. Hartman, of Detroit, and Mr. L. Bright, of Chicago, is reported to have secured control of large placer grounds in this section, to which will be shipped this fall two large Keystone drills and a modern dredge, with a capacity of 100,000 cubic yards of gravel a month. Prospecting is said to have proved the presence of both platinum and gold in paying quantities, and operations are to be carried on by a considerable force of men.

Offers Scholarships for Members of Families of Employees.

To encourage the sons of its employees to obtain technical training, the Canadian Consolidated Mining & Smelting Co. has announced, through Mr. J. J. Warren, managing director, that it will give a scholarship of \$500 per annum, commencing next year, to the man standing first, among the families of its employees, the latter being restricted to those engaged at day labor, in his matriculation examination for an applied science course in the British Columbia University. The further study, which this grant will help finance, may be taken at the B.C. or any Canadian University. It is explained that the company's operations are becoming so extended that there should be, in the future, plenty of scope for the use of men of technical knowledge and, while the policy at present is in its experimental stage, it is likely, if creating the interest hoped for, to lead to development by the corporation of the brains that will be needed for the direction of its operations in coming years.

Developing a Fluorspar Deposit Near Grand Forks.

When Hon. Wm. Sloan, Minister of Mines, accompanied by Mr. J. E. Thompson, member of the British Columbia Legislature for Grand Forks, was making an inspection of the plant of the Canadian Consolidated Mining & Smelting Co. at Trail just about a year ago, he was told of the problem of hydro-fluosilicic acid, it being pointed out that the fluorspar necessary in its manufacture had to be imported from Kentucky, a distance of from 1,500 to 2,000 miles, which made the costs so high that the discovery in this province of such a deposit was a matter of importance to the industry. That such, in fact, was the condition has since been shown, the company having bonded a group of claims known as the Rock Candy group, located on the north fork of the Kettle River, above the city of Grand Forks. Since then, much development work has been done, a car of ore already having been loaded for shipment to Trail. The need of the fluorspar being urgent, no time was lost in putting the property on the producing list and, in view of the difficulties which had to be overcome, what had been accomplished in a short time is worthy of note. The company first had to build a trail, and over this supplies and equipment, including a diamond-drill outfit, had to be packed in on horses to the property. The horses on the return trips have been bringing out ore, so that the company could get a car for test purposes at the earliest possible moment, and the result will no doubt have material bearing on future development, although the property already is regarded as having passed the experimental stage. A right-of-way has been cut through for a new wagon road, towards the construction of which the Mines Department is extending assistance, and before winter, the mines are expected to be making regular shipments.

Some interest has been created in British Columbia by the statement, appearing in the "Financial Post of Canada," that the Canadian Consolidated Mining &

Smelting Co., or interests associated with that concern, are reported to be contemplating the establishment of a steel industry in this province. The site for the plant is said to be near Trail, B.C. Confirmation of this cannot be secured from the local officials of the company.

The Ladysmith Smelting Corporation has ceased operations at Ladysmith again; its smelter having been run for a short time, during which period an accumulation of ore was disposed of. It is understood that options it had taken on a number of British Columbia mining properties, in order to assure a constant supply of ore for the smelter, will be allowed to lapse.

Dividends Declared by B.C. Companies.

Dividends have been declared by five of the chief mining corporations for the first eight months of the current year as follows:—

Granby Consolidated Mining, Smelting & Power Co.	\$1,124,886
Canadian Consolidated Mining & Smelting Co.	523,872
Hedley Gold Mining Co.	72,000
Britannia Mining & Smelting Co.	198,415
Crow's Nest Pass Coal Co.	62,128

May Develop B.C. Iron Deposits.

If the smelter tests prove favorable, immediate developments of considerable deposits of "bog iron," situated on the mainland of British Columbia and near the Pacific Great Eastern Ry., is promised by the operators of the Irondale Foundries. The company expects that the experiments will prove satisfactory and, when that is definitely established, plans to instal the plant necessary for the handling and shipment of the ore in bulk from Mons, a P. G. E. station, close to the properties, to the Irondale furnaces. The run from Mons to Squamish, on the coast, is about forty miles long and is all down grade, and it is proposed erecting bunkers at the latter point with a capacity of 2,000 tons. It is estimated that approximately 600,000 tons of the ore is readily available, while, with proper equipment, a much greater quantity can be recovered.

The Magnesium Sulphate Deposits at Maple Creek.

The announcement that the immense deposit of sodium sulphate and epsom salts, thirty miles north of Maple Creek, near Swift Current, Saskatchewan, contains much potash, has created much interest in British Columbia as, no doubt, it has throughout Canada and America. For several years there has been considerable prospecting for potash in this province, it being the opinion of many that in some sections conditions are in every way favorable for such deposits. The bottoms of a number of lakes in different interior districts have been found crusted with what, in most instances, has proved to be carbonate of soda. The most notable case of this is a lake near Ashcroft, B.C.

Mrs. A. E. Jowett of Trout Lake, B.C., who was the only lady prospector in attendance at the recent mining convention at Revelstoke, B.C., has been able to demonstrate that, even in a rugged country such as the Kootenays of British Columbia, a member of the fair sex can successfully locate, record, and arrange for the development of mineral. Mrs. Jowett has been prospecting in the neighborhood of Trout Lake for a number of years and is the owner of a number of promising properties. One of these is known as the Foggy Day Claim. It has shipped nine tons of ore, giving returns of 4.29 ounces in gold; sixteen ounces in silver; and 4.6 per cent. lead, with an assay value of \$100 a ton.

VANCOUVER ISLAND MINE SAFETY ASSOCIATION.

The coal-mining communities of Nanaimo, Ladysmith, Extension, Wellington and Comox were well represented at the annual meeting of the Vancouver Island Mine Safety Association, which was held at Cumberland on the afternoon of Monday, September 2nd (Labor Day), and the competitions, both in mine rescue and first-aid work, were keen and of high standard.

Hon. Wm. Sloan, Minister of Mines, who attended in person, expressed gratification at the interest manifested by the large attendance from the Island mining district, stating that the members of the various teams demonstrated a gratifying intimacy with the knowledge of their work. He congratulated the programme committee on their arrangements, which were admirable.

In the chief event, the honors were carried off by Nanaimo teams (Canadian Western Fuel Co.), although those from neighboring centres gave them a close run.

In mine rescue competitions, there were six teams entered, and in the first-aid contests, eight teams competed. No. 1 Team (Captain David Brown, of Nanaimo) won the main contest in the mine-rescue contest, the Draeger apparatus being used, its score being 96 points. Second place was taken by the team representing the Reserve Mine (C. W. F. Co.) with 94.4 points. Its captain was Robert Laird. The judges were Mr. H. H. Sanderson, mine safety engineer, Seattle, Wash.; Mr. George Wilkinson, Chief Inspector of Mines for British Columbia; and Mr. J. G. Daniels, mining engineer of the Pacific Coast Coal Mines. Chief Inspector Bagley, of the State of Washington, who had consented to act as a judge, was unable to be present owing to the recent explosion at Burnett, Wash., work in connection with which demanded his attention.

The first-aid contest for the Coulson Cup was won by Mr. J. W. Jemson's team, Nanaimo, the other members of which were Messrs. J. M. McGuckir, R. Shields, G. Langham and James West, while second place was taken by a Cumberland team, the personnel of which follows: Messrs. A. R. Stacey (captain), N. Bevis, J. Quinn, Wm. Beveridge and John Williams. The contest for the Department of Mines' cup and medals was won by No. 1 Team, Canadian Western Fuel Co., which was captained by Mr. Joseph Barton, with whom were Messrs. John Thompson, R. Charnock, James Brown and D. Stobbart. Second place was won by an Extension team, captained by Mr. Alex. Wright, the other members being Messrs. John Wright, Robert Houston, Allan McDonald and Alec Brown. In the three-men event (first aid), a Nanaimo team, made up of Messrs. George Carson, J. A. Challinor and W. Carson, were successful. The two-men event went to Bevon, Cumberland, the winners being Messrs. J. G. Quinn and J. L. Brown.

Mr. Sloan, in distributing the prizes, referred to the importance of such meets from the standpoint of mining, and spoke of the importance of the competitions, which had just been held, as a means of perfecting the instructions of those taking part. He announced that the next year's contests would take place at Nanaimo, and preparations already were under way to make them the most important ever held in Western Canada; in fact, it was proposed that their scope should be enlarged to take in other sections of the Pacific coast. As the representative of the Nanaimo district in the local Legislature, a position of which he was proud, he intended taking an active part in seeing that it was made an outstanding event.

SMELTER CHARGES INCREASED.

The announcement by the Canadian Consolidated Mining & Smelting Co. of further increases in smelting charges has again somewhat stirred the mine operators of British Columbia and promises to bring prominently to the fore the agitation for a Royal Commission to investigate the affairs of the company, with special reference to the fairness or otherwise of its smelting rates. This matter is before the Dominion Government still, and it is expected that something will be known as to its policy at an early date.

Following is the company's latest statement:—

"Trail, B.C., July 31st, 1918.

"To Lead Ore Shippers:

"Since Schedule B lead-ore rates was published, we have been obliged to pay 40 cents per ton more for coke to the collieries, which under that schedule amounts to an increase of 10 cents per ton of ore. In addition to this, there may be an increase of freight on coke; but we are not certain yet of this, and there will be a further increase in price effective August 1st.

"We have been obliged to increase the wages at the smelter by 30 cents a shift, so that there is an increase of 45 cents per ton under Schedule B on this account.

"Effective August 1st, we will, therefore, increase the base rate under Schedule B by 55 cents per ton, plus 25 per cent. of the further increase in coke price and freight.

"Effective August 12th, rates on lead from Tadnac have been increased to \$14.30 to Toronto, and \$16.50 per ton to Montreal. The increase in freight rate from that which prevailed at February 1st is, therefore, \$2.30 per ton on shipments to Toronto, and common points and \$4.50 per ton to Montreal and common points. Commencing with shipments received here in August, we shall be obliged to make an adjustment on account of this freight increase.

"As there is considerable difference now between the Montreal and Toronto freight rates and it is impossible to forecast the distribution owing to variations in munition demand, we, therefore, as the simplest plan, to make this adjustment commencing with the ore received in August, by reducing the lead settlement price by the actual increase in the lead freight rates.

"We will advise you as soon as possible of the amount of the further increases in coke price and freight.

"Yours truly, (Sgd.) S. G. BLAYLOCK,
"Assistant General Manager."

U.S. Navy Using British Columbia Coal.

Vancouver Island coal is being utilized by the United States Navy Department on a large scale, the Canadian Collieries (Dunsmuir), Ltd., having entered into a contract to supply as much as can be mined for export. One of the company's officials, in confirming the report, stated that there was no limit to the amount, it being understood that the Naval Department would take as much as could be delivered. Some weeks ago, the first cargo of coal under the new arrangement was loaded by a vessel of the U.S. Shipping Board's fleet at Comox for delivery at the Pearl Harbor Naval Station, Hawaiian Islands. Others have made calls for coal having a similar destination and all ships making their base at the Bremerton Navy Yard will burn Comox coal. This coal, some years ago, was subjected to exhaustive tests as to its suitability for use on American warships and, as a result, the British Columbia production was declared to be almost as good in steaming qualities as the American Navy standard.

DR. RUTTAN ON POTASH PRODUCTION.

"We are unable to state that there is any process going on in Canada at present where potash is being obtained economically from feldspar, in spite of announcements to the contrary," stated Dr. R. F. Ruttan, at a recent meeting of the Associate Committee on Chemistry of the Honorary Advisory Council for Scientific and Industrial Research. "There is one process that is commercially a success as far as it has gone, and that is hydrolysis of potash feldspar by means of lime and steam at a high pressure. This is being worked in New Jersey and on the Hudson River. The valuable product is a very high grade of brick for exteriors of high buildings, as its crushing strength, resistance to heat and hardness are better than other bricks, and about 6 or 7 per cent. potash is a by-product.

"It has been found that glauconite gives a better yield of the brick-making material and a better yield of potash than can be obtained from feldspar. This company is now utilizing the green sands of New Jersey for the manufacture of these bricks and potash. A report from British Columbia is that a bed of glauconite has been found there. If true, this can be utilized for obtaining potash. The same thing was found in connection with the ash from straw. In each case, the combustion is so rapid that the draught carried away most of the ashes. Condensation of potash salt from vapors of cement works has been a source in the United States, and one firm in Canada has introduced a few condensation pipes for experiments. Analysis of the material used in this plant justified the expenditure necessary to install a Cottrell system. There is no reason why analysis should not be made of the cement dust of all our large cement works through the country, and many, I am sure, could produce sufficient potash to justify the Cottrell process.

"A good deal of potash is now coming in Canada from hardwood ashes. The old industry of collecting these ashes and leaching them for their potash has been renewed in some of the cities, but how much is resulting from this source cannot be estimated. Glauconite is worked in England simply for its potash.

"Some investigations are being carried on in the Kingston School for Mining regarding the use of the nepheline syenite. This rock contained four or five per cent. potash. Progress is now being made in preparing a fertilizer from this rock. I am not sure whether it is a commercial success or not. Every encouragement has been offered those who are investigating methods for obtaining potash from feldspar. So far, there is no absolute proof that any of these processes are commercial."

TEMISKAMING.

The directorate of the Temiskaming Mining Company, Limited, has issued a special report to the shareholders. Production for the five months ending May was 391,367 ounces, while the ore reserves are estimated by the manager at 101,498 ounces. During the six months ending June last considerable development work was carried on, the footage in drifting, cross-cutting, winzing and raising totalling 1,496.2. There are still on the property three unexplored areas in which there are said to be reasonable possibilities of finding commercial ore bodies. It is ten years since the mine began shipping silver, while the total shipping production up to the end of 1917 was 10,837,021 ounces.

GRANBY PLANTS AT PHOENIX AND GRAND FORKS CLOSED DOWN.

From a mining standpoint, what is known as the Boundary District of British Columbia has suffered a blow in the recent closing down of the Phoenix Mines of the Granby Consolidated Mining & Smelting Co., with the consequent discontinuance of operation of the Grand Forks B.C. smelter. The absence of this industry, apart from the general indirect effect, means a serious loss to the West Kootenay Power & Light Co., which for years has supplied power for this plant, and to the small mine operators accustomed to make shipments of ore to the smelter for treatment, besides throwing many employees out of work. The explanation given by the company is that it is no longer profitable to handle the low-grade ore of the Phoenix mines, because of increased costs, among those things, instances being the increase in the cost of hydro-electric power, increased price of coke and increased railway freight rates.

These mines, it is pointed out, have been operated for some time on an exceedingly narrow margin, it taking 22½ cents per pound to produce a pound of copper from the ores because of the high costs. With the old U.S. Government price of 23½ cents per pound, there was a margin of profit of one cent. The subsequent increase to 26 cents per pound did not make the difference that might have been looked for, owing to the almost simultaneous rise in freight charges, etc.

The operation of the Phoenix Mines began in 1901, when, under the management of the Granby Company, they produced 169,087 tons. In that year the first smelting furnace of 300 tons capacity was completed and produced 8,871 ounces of gold, 34,990 ounces of silver and 5,435,955 pounds of copper. Additions to the smelter were made from time to time until its daily capacity attained 4,500 tons a day. The converter plant was established at Grand Forks in 1902, and its capacity increased in 1909.

The Phoenix Mines have produced up to the end of the last financial year, according to conservative estimates, ore to the value, approximately, of \$55,550,000, or nearly 10 per cent. of the total mineral production of British Columbia up to June 30th, 1917.

Hope has not been abandoned of persuading the Granby company to continue its operations in this district and, in this connection, Mr. J. E. Thompson, member of the local Legislature for Grand Forks, states that the company's plans must not be accepted as contemplating the abandonment of the camp, even temporarily. He asserts that it is most probable that, after affecting some repairs to plant, the industry will be re-established.

The main operations of the Granby company are on the coast. The Hidden Creek mine being a very large producer. The company's smelter at Anyox is making a large output.

NEW ISSUES.

The Department of Finance is circulating a memorandum respecting the regulation of issues of securities and shares under the order in Council of December 22, 1917. It is again pointed out that the provisions of the order apply to the issue of securities and shares under all circumstances, whether offerings are to be made to the public or not, and that no issue can legally be made until the consent of the Minister of Finance has been obtained. Details are to be furnished both as to how the proceeds of the issue will be used and as to how it is proposed to dispose of the securities or shares.

NIPISSING.

In his report to the President and directors of the Nipissing Mining Company Manager Hugh Park says that during the month of August the company mined ore of an estimated value of \$250,737 and shipped products from Nipissing and customs ore of an estimated net value of \$484,978.

"Underground work," says Mr. Park, "continued as heretofore, and some small veins were encountered at 73 shaft and at 96 tunnel. They are sufficiently encouraging to warrant further development. Development on all the 'town' veins was somewhat hampered during the month on account of the aerial tramway line connecting 73 shaft with the low-grade mill being partly destroyed. Several stores situated underneath the tram line were consumed by fire. The line was out of commission for ten days. During that time it was impossible to hoist any ore from 73 shaft, and it was necessary to provide the low-grade mill with tonnage from the township side of the lake. Most of that tonnage was low-grade material. Consequently, the production from both the washing plant and the low-grade mill for the month was decreased. The high-grade mill treated 98 tons and shipped 462,965 fine ounces of silver. The low-grade mill treated 6,890 tons."

KERR LAKE.

During the month of August the Kerr Lake Mining Company produced upwards of one-quarter of a million ounces of silver. This compares with 231,000 ounces in July. With the exception of the month of May, the August record was the highest in the Kerr Lake's history. The company's fiscal year ended August 31st, with a total output for the year of upwards of 2,575,000 ounces.

SHIPPING COPPER ORE FROM TIDEWATER

An extensive programme of development is being carried out on the property of the Tidewater Copper Company, Sidney Inlet, Vancouver Island, according to Mr. W. G. Tanner, vice-president of the company, who has returned from the mines. At present, the old workings are being opened up, and to facilitate shipments a tunnel is being driven through the mountain, while a small railroad is under construction connecting with the bunkers and the wharf. Mr. Tanner reports that a shipment, valued at \$20,000, was made recently to the Tacoma Smelter.

The Tidewater is an old and well-known British Columbia mining property, having been operated first by the late Lieut.-Governor Dwedney and associates. They shipped some 10,000 tons of 4 per cent. copper ore and development carried to the point of uncovering a considerable body of good ore. At that time, however, the price of copper was not high enough to make the property profitable, and it was closed down. Since the outbreak of the war and the consequent increased demand for copper, together with the advance in prices, it again, in common with other mines of similar condition in this province and elsewhere, attracted attention and finally was taken over by its present operators.

The demonstration float arranged by the Hull Iron & Foundries, Ltd., for the Labor Day parade, which showed men actually engaged in pattern-making, moulding, core making and pouring metal, won the cup awarded for the best exhibit in the Ottawa-Hull parade.

BRITISH COLUMBIA INTERESTED IN GOLD CONFERENCE AT SPOKANE.

An invitation was extended Hon. Wm. Sloan, Minister of Mines of British Columbia, to attend an international conference to be held at Spokane, Wash., on the 5th and 6th of September, for the purpose of discussing the world's supply of gold and the best means of stimulating the production of the precious metal in the Northwest. Mr. Sloan expressed his appreciation of the importance of the matter and gave his pledge that the province would be represented at the conference. While the question is one of general interest to the mining fraternity, it perhaps is of special interest to British Columbia, because the Rossland Camp, in years past one of the most stirring of the province, has been practically closed down owing to the steadily declining purchasing power of the dollar and the ever stationary value of gold. The reasons given by the Canadian Consolidated Mining & Smelting Co. for the discontinuance of work at Rossland have been given already in these columns. It may be said, by way of explanation, that the company takes the simple position that the cost of mining—material, labor, etc.—has made the operation of the mines in question unprofitable.

MARKETS

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
Cobalt oxide, grey, \$1.65 per lb.
Cobalt metal, \$2.50 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 12 cents per lb.

Sept. 12, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 11 cents per lb.
Lead, 10¼ cents to 10½ cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.

Sept. 12, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$11.00 per ton.
Coal, bituminous, nominal, \$9.25 per ton.

NEW YORK MARKETS.

Copper—Fixed for the period August 7 to Nov. 1, 1918, at 26 cents per lb.

Tin—Prices are nominal. Supply is controlled by the American Iron and Steel Institute.

Silver—The U.S. Treasury announced on Aug. 15 that the maximum price was fixed at \$1.01½ per ounce.

Lead—The producers' price is 8.05 cents per lb.

Zinc—The U.S. Government price for Grade A spelter until the end of 1918 is fixed at 12 cents per lb.

SILVER PRICES.

	New York cents.	London pence.
September 12	101½	49½

Nipissing Mines Company, Ltd., has declared a dividend of 5 per cent., and bonus of 5 per cent., payable October 21 to shareholders of record of September 13.

STANDARD MINING EXCHANGE.

(Messrs. J. P. Bickell & Co., report the following quotations on the Standard Stock & Mining Exchange, Sept. 12, 1918.)

Gold.		
	Ask.	Bid.
Apex	.03½	.03¼
Boston Creek Mines	.20	...
Davidson Gold Mines	.34	.32
Dome Cons. Mines	.03	...
Dome Extension	.15	.14½
Dome Lake	.14	...
Dome Mines	9.45	9.25
Eldorado	...	.½
Elliott Kirkland	.38	...
Gold Reef	.02	...
Hattie Gold Mines	.75	...
Hollinger Cons.	5.10	4.95
Keora	.07½	.04
Kirkland Lake	...	.37
Lake Shore Mines, Ltd.	.70	.68
McIntyre	1.49	1.48
Moneta	.07½	.07
Newray Mines, Ltd.	.16	.15
Porcupine Crown	.14	.13¼
Porcupine Imperial	.02	.01½
Porcupine Tisdale	.01½	.01¼
Vipond	.14	.13¾
Preston East Dome	.03½	.03¼
Schumacher	.21	.19
Teck-Hughes	.25	.22
Porcupine V. N. T. Gold Mines	...	.13
Thompson Krist	.05	.04¾
West Dome	.09¾	.09½
Wasapika Gold Mines, Ltd.	.30	.25

Silver.

	Ask.	Bid.
Adanac	.07½	.07
Bailey	.03¾	.03¼
Beaver Consolidated	.30	.29½
Chambers-Ferland	.11	.09¾
Crown Reserve	.22	.17
Foster	.03	.02
Gifford	.02¾	.02½
Great Northern	.05	.03½
Hargraves	.04¼	.04¾
Hudson Bay	22.00	20.00
Kerr Lake	...	5.50
La Rose	.54	.52
Lorrain Con. M. Ltd.	.02	...
McKinley-Darragh-Savage	.42½	.41
Mining Corp. of Canada	2.70	...
Nipissing	9.00	8.80
Ophir	.06	.05¾
Peterson Lake	.09¾	.09½
Right of Way	.04	.03
Seneca-Superior	.01½	...
Silver Leaf	.01	.¾
Temiskaming	.31	.30¾
Trethewey	.28	.27
Wettlaufer	.07½	.04½
York Ont.	.02	.01½

MINING ACTIVITY IN WESTERN BRITISH COLUMBIA.

Mr. W. M. Brewer, Resident Mining Engineer for the Western District of British Columbia, speaks most enthusiastically regarding present conditions in regard to the mining industry in this section of the province. He says that in over twenty years he has never seen the prospect more encouraging. Some of the activities that have come to his attention are thus summarized: The Phelps-Dodge interests have taken bonds on the Fraser Group (East Sooke); the Ladysmith Smelting Corporation has bonded the Willow Grouse, Cowichan Lake; the Ralph Properties are under charge of Mr. Aldrich, New York, ex-manager of the Trail Smelter; and the Sunlock Mines, Jordan River, are being run by Mr. Pat. Stewart for an all-Vancouver Company. In the Alberni Canal region Mr. Samuel Ryder, of St. Albans, England, has installed new bunkers and a compressor plant at the old Monitor mine, which was sold three years ago for taxes. It is reported that a large body of ore has been blocked out. At Quatsino Sound, also Vancouver Island, the Coast Copper Co. is working the Old Sport Group on Elk Lake and plans are said to be under way for a sixteen-mile railroad from the mines to the coast. At Sidney Inlet, the Tidewater Copper Co., of New York, is working on the Indian Chief Group, a former Dwedney holding, and at Knights Inlet the Princess and Union Groups are being operated. Work is proceeding on the Texada Island properties and prospecting forces are working everywhere, particularly on Hervis Inlet.

OPPORTUNITIES

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One of the greatest factors in development of mineral areas is the provision of transportation facilities. Railways and the mining industry have together played a very important part in the development of several parts of Canada.

The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

The Canadian Northern Railway in Manitoba gives access to the Pas Mineral Area. In Alberta the Canadian Northern is serving important coal fields.

THE DEPARTMENT OF RESOURCES CANADIAN NORTHERN RAILWAY

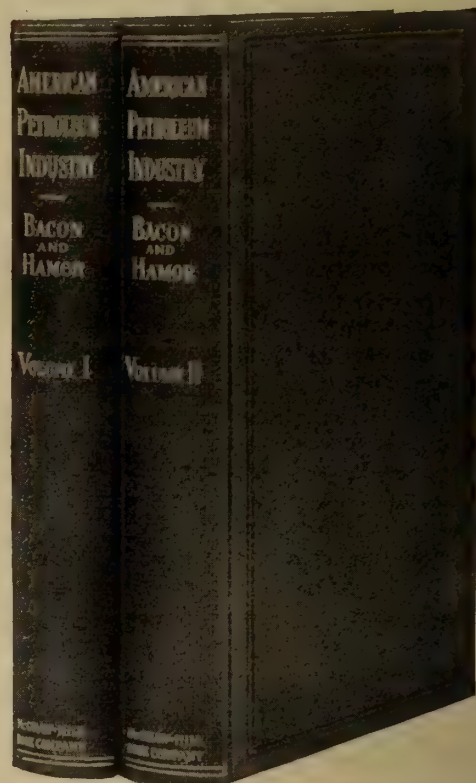
The Department of Resources, Canadian Northern Railway Building, Toronto, will be pleased to furnish information about the districts served.

Dr. Charles F. Mabery said, in the Journal of Industrial and Engineering Chemistry:

"In the general plan and scope of this work it seems difficult to suggest an improvement. The evident care in its preparation, the statements supported by numerous citations from petroleum literature, and the cooperation of practical experts, are the best assurance of its accuracy."

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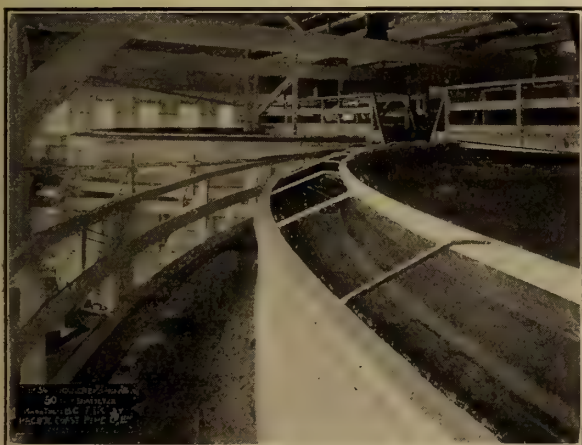
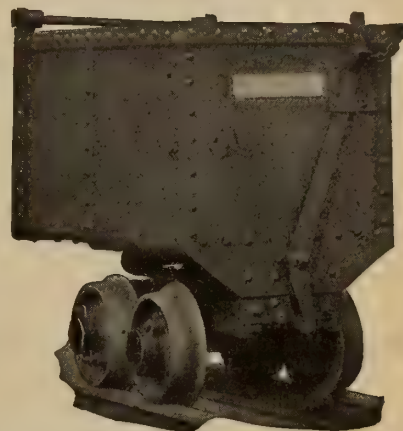
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- Iron Ore Occurrences in Canada, Vol. 1. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol. IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Mining of Thin Coal Seams of Eastern Canada, by J. F. K. Brown
- The Mineral Waters of Canada. Vol. I., by John Satterly, M.A., D.Sc., and R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 102. Espanola district, Ontario, by Terence T. Quirke.
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe county, Ontario. Topography.
- Map 167A. East Sooke, Vancouver Island. Geology.
- Map 168A. Deposits of stone and gravel available for a highway between Ottawa and Prescott, Ontario.
- Map 1662. Ottawa, Carleton and Ottawa counties.
- Map 1665. Stone available for road material, Hull to Grenville, Quebec.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.
- Map 1692. Amisk and Athapapuskow lakes, Saskatchewan and Manitoba.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway, in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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- Perforated Metals—**
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- Pig Tin—**
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- Pig Lead—**
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Pipes— Canada Metal Co., Ltd. Consolidated M. & S. Co. Northern Canada Supply Co. Smart-Turner Machine Co.	Pumps—Pneumatic— Smart-Turner Machine Co., Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	Screens—Cross Patent Flang- ed Lip— Hendrick Mfg. Co.	Tanks—Cyanide, Etc.— Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd.
Pipe—Wood Stave— Pacific Coast Pipe Co., Ltd.	Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Can. Allis-Chalmers, Ltd. Smart-Turner Machine Co.	Separators— Smart-Turner Machine Co.	Tanks (water) and Steel Towers— Gould, Shapley & Muir Co., Ltd.
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Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	Pumps—Vacuum— Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd. Mine & Smelter Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Hadfields Ltd.	Shovels—Steam— M. Beatty & Sons.	Transformers— Can. Gen. Electric Co., Ltd.
Pulleys, Shafting and Hang- ings— Northern Canada Supply Co.	Rails— Hadfields Ltd.	Smoke Stacks— Can. Allis-Chalmers, Ltd. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Marsh Engineering Works.	Tubs— Hadfields Ltd.
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Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Steel Castings— Hadfields Ltd.	Twist Drills—High Speed— Can. B. K. Morton Co.
Pumps—Centrifugal— Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Mine & Smelter Supply Co.	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton.	Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	Welding Rod and Flux— Imperial Brass Mfg. Co.
Pumps—Electric— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	Rolls—Crushing— Hadfields Ltd.	Steel Drums— Smart-Turner Machine Co.	Welding and Cutting, Oxy-Acety- lene— Imperial Brass Mfg. Co.
Pumps—Sand and Slime— Mine & Smelter Supply Co.	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son. Mine & Smelter Supply Co.	Steel—High Speed— Can. B. K. Morton.	Wheels and Axles— Hadfields Ltd.
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		Switchboards— Can. Gen. Electric Co., Ltd.	Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.
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		Tanks (Wooden)— Gould, Shapley & Muir Co., Ltd. Pacific Coast Pipe Co., Ltd.	
		Tanks—Steel— Marsh Engineering Works.	

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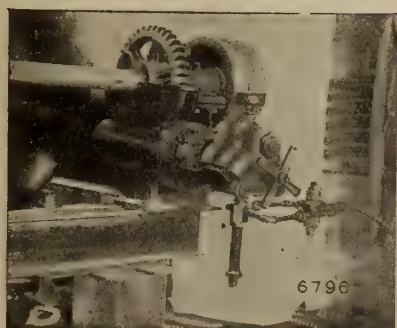
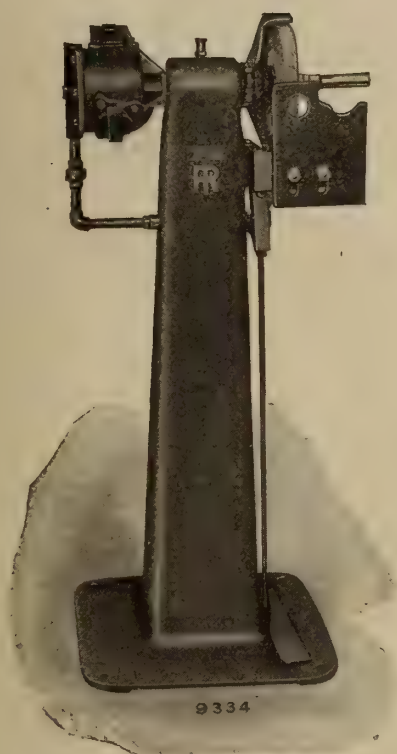
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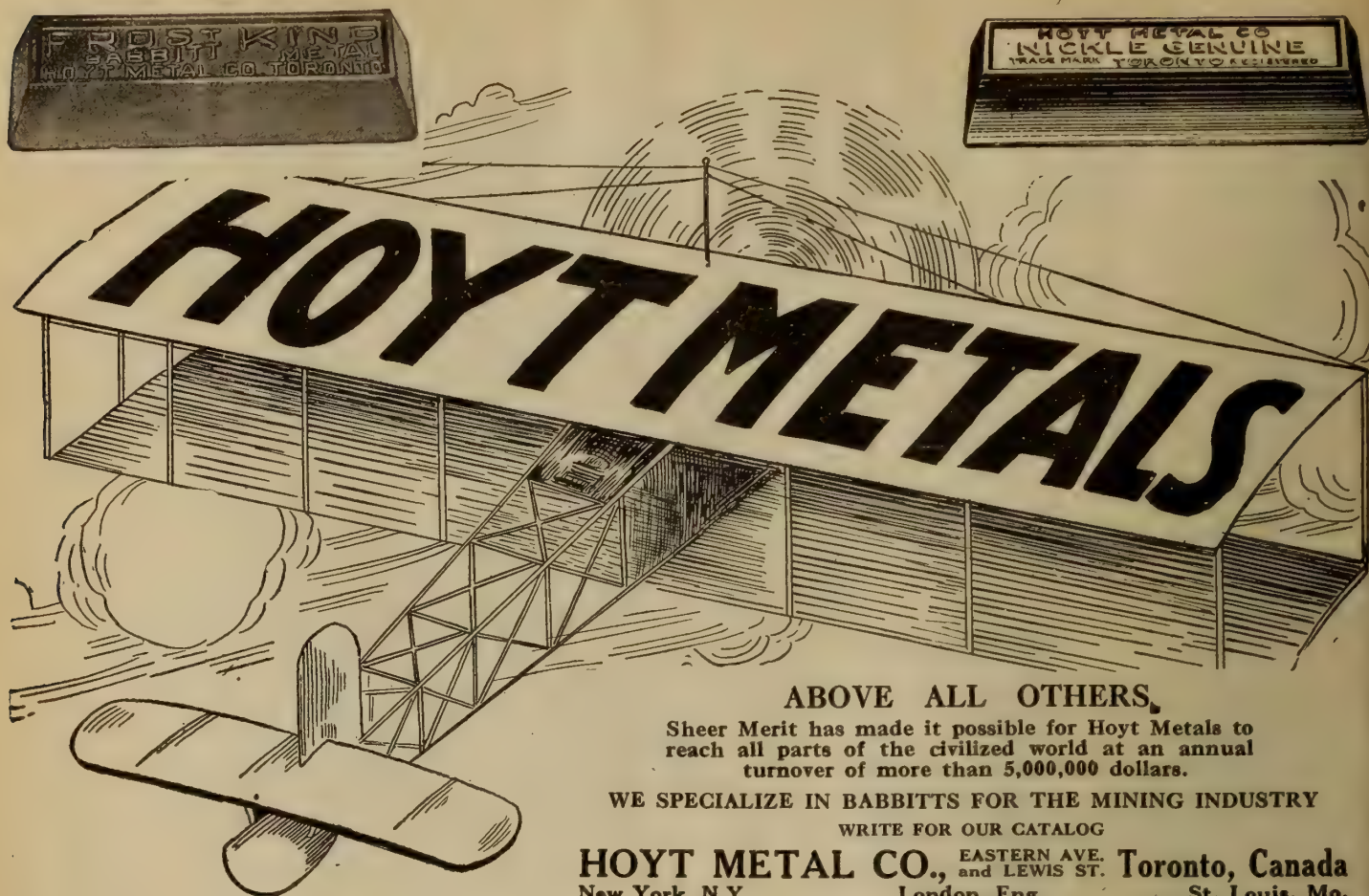
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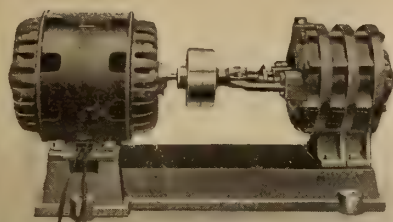
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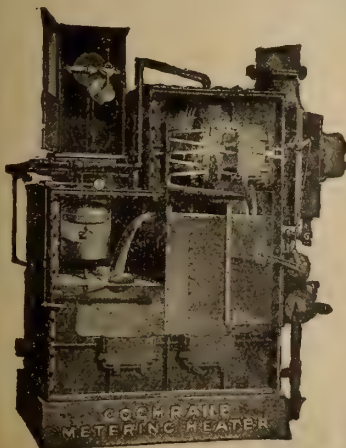
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

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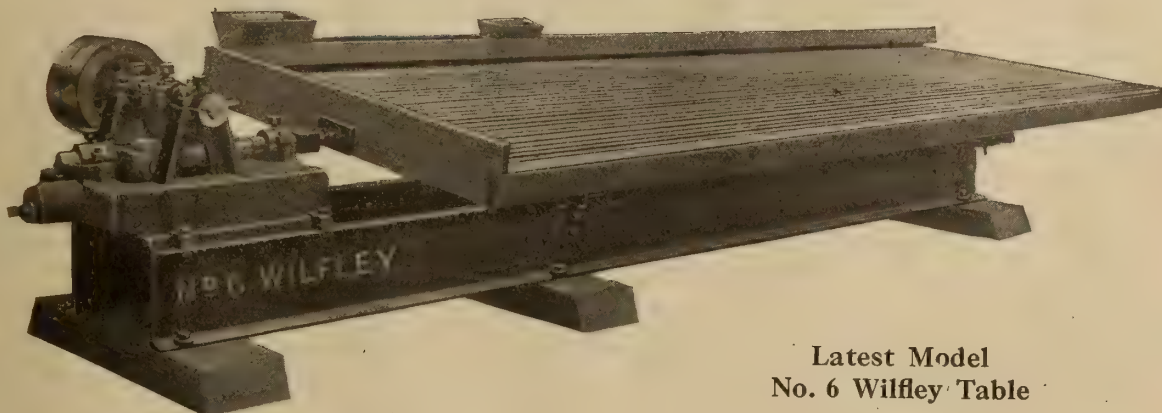
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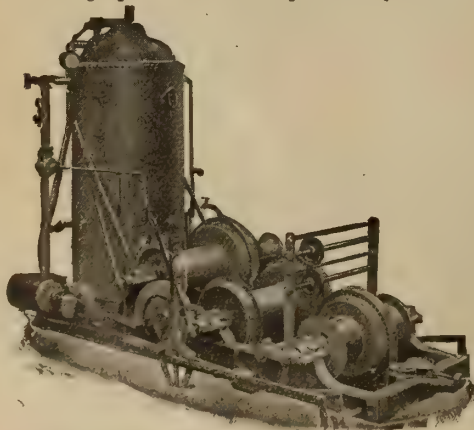
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SIXTEEN MINERS KILLED AT NANAIMO.

Sixteen miners lost their lives on the morning of Tuesday, September 10th, when the cage in which they were descending the Protection Island Shaft of the Canadian Western Fuel Co.'s Mine, Nanaimo, B.C., became detached from its cable and fell a distance of approximately 300 feet. The cage had raised all the men of the night shift to the surface and carried six loads of sixteen down when the accident happened. It had scarcely left on its seventh trip when the cable parted, the miners still waiting their turn being informed of what had taken place by seeing the parted cable, released of its load, swinging loose in the shaft. Subsequently it developed that the safety locks had failed to act and that the cage had struck the loading landing, constructed of twelve-inch timbers, with such force that it went through, finally resting 50 feet lower on an abandoned level not used since the upper seam was opened some years ago.

This is the most serious coal mine disaster that has occurred in British Columbia since early in the month of April, 1917, when 34 miners lost their lives in an explosion at the Coal Creek Mines, Crows Nest Pass Colliery, Fernie. Hon. Wm. Sloan, Minister of Mines, has promised that the fullest investigation will be made in order that the responsibility may be fixed.

NO MORE CHEAP COAL

Having in mind the great need for increasing production of coal, it is distressing to learn that miners are idle in coal mining districts in Nova Scotia and British Columbia. In view of the high cost of living, it is natural to expect that high wages must be paid, and it is not surprising that some workers are ready to take advantage of the shortage of labor to demand higher wages than the conditions warrant. It is regrettable that in Pictou and Fernie valuable time has been lost by the men going on strike and showing an unwillingness to do their part towards keeping production of coal from falling below the already disappointing level. Coal miners, or any other men, who quit at this time, when so much depends on the maintaining of the output of munitions of war, need not be surprised if their actions bring public disfavor.

We are pleased to learn as we go to press that the Pictou miners have agreed to return to work, and we hope that the miners in the Fernie district will soon find it possible to do likewise. We have no doubt that the majority of miners on strike regret that they have given the public such a bad impression by their action.

There can be little doubt that coal miners have been justified in asking for higher wages than they received a few years ago. They are now, however, receiving much higher wages. We believe that coal miners deserve higher wages for their hard and dangerous work than workmen who have easier and safer occupations and we hope that the very low wages of pre-war days will never return. We have, however, little sympathy for the men who seek to take advantage of present conditions to force, by strikes, unreasonably high wages regardless of the effect of their action on the war effort.

The low wages that prevailed in coal mining regions in former years were largely due to the low prices at which coal has been sold. We believe that investigation will show that coal has for years been selling at too low a price in North America. The men who mine the coal deserve more than they have received for their labor, and the men who supplied the money for the industry deserve more than they have received for the use of the money. The capital invested in mines and plants is very large and the dividends small. Consequently, the industry has been unable to give high wages to miners. The whole matter needs adjustment and it looks as though adjustment may come soon. Undoubtedly the public will have to pay more for coal than in the pre-war days.

One natural result of higher price for coal will be higher wages to coal miners. Another good result will be more complete utilization of our water powers. Both are things much to be desired.

A Possible New Fuel Oil Industry for Canada

By James Ashworth.

For quite a number of years a small coalfield has been known to exist about fifty miles north of Kamloops. It was visited and reported on by Dr. Dawson, who stated that the seams were too thin for operation. The exposures so far discovered are all at Chu Chua in one creek called Coal Creek. Since Dr. Dawson's visit, another seam of coal of workable thickness has been discovered, and to some extent worked. The coal, when tested on the Canadian Pacific Railway, was reported as having given very satisfactory results. At that time, there was no railway transit to and from Chu Chua, but now the Canadian Northern Pacific Railway passes through the district and through the coalfield. A workable seam of cannel coal has also been discovered, but never opened up. Later still, another seam of coal has been disclosed by a freshet, and will doubtless receive attention from one of the syndicates which have been formed to test the possibilities of the coalfield. The coal previously worked proved to be of a hard bituminous and coking quality, though at present it is not known whether the coke will be sufficiently hard for metallurgical purposes.

Cannel coal is also known in the Crow's Nest Pass coalfields and oil shales will probably be found when they are systematically looked for.

As a consequence of the excessive demand for mineral oil for war purposes, the ordinary sources of supply have proved insufficient to meet the demands of the market, and, therefore, other sources must be energetically prospected. One other source, which is receiving close attention in Great Britain and the United States to-day, is to extract oil from cannels, bastard cannels, shales, torbanites, blackband ironstone, coal, lignites and peats. In Scotland, large tonnages of oil shale have been and are being converted into fuel oil and for other purposes. The fuel oil yield is not more than 60 per cent. of the total yield of, say, 20-30 gallons per ton. Very few cannels yield as much as 50 gallons of oil per ton, but many of them will produce 40, and some of the Utah shales as much as 80 gallons per ton. The yield of sulphate of ammonium is very considerable, and may, with high-temperature carbonization, reach 60 lbs. per ton of cannel. Paraffin wax may also be extracted.

Experiments made on coal for the Nitrogen Products and Carbide Co. in Lancashire, with the Glover-West vertical retorts, showed that if 4.2 tons per 24 hours were put through at a temperature of 1,411 degrees Cent., and 2.6 tons per 24 hours, at a temperature of 1,194 degrees Cent., that more tar oil was produced per ton at the lower temperature. Good cannels should, therefore, be treated for oil in low temperature retorts.

At a meeting of the Manchester Geological Society, on the 12th of March, a paper was read by Mr. J. Drummond Paton, on the recovery and use for oil and power purposes from wastes, shale and lower grades of coal. The process advocated was to carbonize the coal, cannel, shale, etc., in a short period of time, so that the lighter gaseous hydrocarbons (which condensed as tar oils) were not destroyed by a high temperature. The apparatus used was the Tozer concentric retort, working under a high vacuum of 20 inches of mercury. Carbonization was perfected in four hours. The crude oils (water free) varied from 16 to 80 gallons per ton of

coal carbonized. The purified oils were of the paraffinoid series, and the light oils were excellent for motor spirit and resembled petrol in their efficacy.

Napthalene and anthracene were entirely absent. The tar acids were practically phenols and cresylic acids, and were produced at temperatures of from 900 deg. to 1,200 deg. Fahr.

The yield of gas was from 5,000 to 6,000 cubic feet per ton, and its heating value about 800 B.T.U. per cubic foot. The cannel gave 6,000 to 8,000 cubic feet of gas per ton. The residual coke retained from 7 to 10 per cent. of a volatile inflammable non-smoking gas, which burned with a lambent, smokeless flame, yielding great heat, with an approximate calorific value of 13 500 B.T.U.'s per cubic foot.

Very inferior coals yielded good fuel results, but for a high yield of oil, cannels and shales were certainly preferable.

It was found that a thickness of 2½ inches in the retorts was the best basis for carbonization. The same material which gave the low temperature distillates also gave the benzoid series.

The United States Department of Mines has made a practical search for oil shales, and their development and conversion into oil is now practically established.

It is important, therefore, to note the difference between coal and cannel coal and between these and oil shales—the first when of a bituminous quality will usually produce good coke as one of its residuals, but cannel and the oil shales do not produce a metallurgical coke, though the residue of some of them may be used to heat retorts and stoves. Cannel coal and oil shales were, before the discovery of petroleum, largely used as the source of mineral oil.

Cannel coal being the resultant of the oxidation of water-laid deposits consists mainly of plant spores, pollen and the remains of water plants, animals and fish. As a source of oil, the cannel which contains the least water and the highest percentage of hydro carbons is the most desirable.

It is recognizable by its velvety appearance and its peculiar conchoidal fracture, is jointy and hard, does not blacken the hands, and is almost immune from weather effects. In the best cannel, the fixed carbon is much less in percentage than the volatile content. Cannel deposits, having been collected and formed in basins or lagoons, are not so regular in formation as is coal, and yet cannel and coal may be found in close contact and as part of the same seam. The illuminating value of gas made from cannel is greater than that made from coal, and the yield of oil per ton is also very much greater. One high-class cannel in the Wigan Coalfield, England, is known as Curley or Birds-eye Cannel, from its peculiar fracture. In the shales overlying cannel it is often possible, when the shale weathers and splits into thin sheets, to find very interesting fish remains.

Cannel coal, when scratched, gives a brown streak and its specific gravity being lower than coal, it naturally results that the lighter it is, the more valuable it becomes.

When examined under the microscope, it shows that plant spore cases and waxy resinous matter are its main constituents. Where the seam has been changed

into coal, we may assume that originally a larger percentage of water-growing plants or bog had accumulated. Naturally, it results from this mode of deposition that basins of cannel coal are found to be very irregular in area and thickness, and also as frequently occurs, they are overlaid by bituminous coal of a more regular thickness.

In Great Britain, two official reports of committees appointed to deal with the question of home sources of fuel oil have recently been issued. These were (1) that of the committee appointed by the Ministry of Munitions of War on the "Production of Oil from Home Resources," and (2) that of the "Interim Report of the Committee on the Production of Oil from Cannel Coal and Allied Minerals," appointed by the Council of the Institution of Petroleum Technologists.

The summary of the conclusions of the first of the above committees was as follows:—

"(1) That the scheme for the carbonization of cannel coal and kindred substances recommended in the Petroleum Research Department's report was not a practicable one, and that the Ministry of Munitions were justified in declining to embark on it. (2) That the alternative policy of developing the production of fuel oil from cannel coal and kindred substances in existing vertical retorts at gas-works should be developed within the limits indicated in this report. (3) That the decision of the Ministry of Munitions to erect a battery of the Chiswick form of retorts was the right course to adopt in the circumstances."

The possibility of obtaining oil in quantity from the low temperature distillation of cannel coal and its cognates was considered by the second of the above-named committees under the following heads: (1) As an immediate war measure, having in view the production of motor spirit and fuel oil for the services; (2) As a permanent commercial undertaking and a measure of reconstruction.

They now strongly urge the adoption of the following recommendations:—

"(1) That the War Cabinet should be invited to lay down a definite policy for the guidance of the Departments as to the relative national value and importance at the present time of oil and coal, the provision of the necessary labor, raw materials and transport. (2) That the Government should afford all necessary facilities to those who are prepared to find the capital and take the risk for the erection at suitable centres of plant for the treatment on a commercial basis of the material known to exist. (3) That an experimental station be established forthwith, so that retorts of any design provisionally approved by the Institution of Petroleum Technologists can be erected and tried out, and material tested with a view to ascertaining its character, oil yield and residual values. (4) That such experimental station shall be maintained by and at the expense of the Government. Or, alternatively, (5) That the Government shall afford all necessary and reasonable facilities to the Institution of Petroleum Technologists for the erection of a testing station of their own."

In reviewing the above-named reports, the Iron and Coal Trades Review, of London, England, August 9th, 1918, says:—

"From the point of view of the coalowner and the miner, the statements contained in Clause 7 are of considerable interest. Various estimates have been made from time to time as to the additional amount of material which could be brought up by the utiliza-

tion of the shovel, instead of the fork, and perhaps to say 15 per cent. would not be too high. If, therefore, the nation could be provided with a sure supply of oil by bringing up this material, the miner be paid for filling, and the colliery owner obtain a remunerative price for such material for the production of oil, it is quite obvious that the consent of the Government to the recommendations of the Committee would be of the greatest national importance, not only to the consumer, but to those directly and indirectly associated with the mining industry of the country. The question of the utilization of colliery waste is one which has for long been under consideration, and this solution, advocated by some of the highest technical authorities in the country, is one which should receive the general support, not only of those responsible for the provision of oil, but of the colliery owner and the miner.

Now that we have the two reports side by side, one more or less of a political character and the other signed by a committee of experts, it is interesting to recall that the Fuel Research Board (Sir George Beilby, director), which issued its report on September 10th, 1917, finds that "no new carbonization scheme can be justified economically, if it can only live by poaching on the preserves of the existing industries."

The stress of war conditions is now being brought to the attention of the general public, through the shortness of gasoline, and fuel oil, and the consequent closure of garages and stoppage of their use on Sundays. It is also evident in the replacement of fuel oil by coal and coal dust, both ashore and at sea. These indications of "want" cannot be lost sight of, but they do not appear to have received any practical attention from the Scientific and Industrial Research Board. This Board does, however, appear to have taken a distinct interest in the production of an anthracitic briquette, from the lignite coals of Saskatchewan, and in this way some of the residuals may do something to relieve the urgent demand for oil. There is, however, the possibility that this proposal will not come into practical effect until the war is over, and the urgent demand for mineral oils and spirit has become a thing of the past. If the expensive experimental plant to be erected by the Provinces of Saskatchewan and Manitoba, does not prove successful, in competition with the real anthracitic coals of Alberta, then it may prove to be useful and profitable as a means of treating oil shales, if these can be discovered within a reasonable distance of the works.

Canada has become used to a "bonus" system to encourage the introduction of new industries, and the present seems to be a suitable time to further extend this system to encourage the production of oil and other by-products from coal and oil shales, as has already been recently done by the Province of British Columbia as regards iron and steel.

The discovery of manganese ore in the Cowichan district, Vancouver Island, promises to prove of considerable importance to this section of British Columbia and, more important, to provide quantities of that essential mineral for munition manufacture in Canada. Samples treated by the Provincial Mineralogist are said to indicate the presence of ore of just the character that is so much required. A Vancouver, B.C., firm's certificate shows 46.20 manganese, 26.92 silica, and 0.064 phosphorus, while a Seattle assay reads: Manganese 54 per cent., and silica 18.4 per cent.

THE LABOR TROUBLE AT FERNIE.

At the time of writing, September 21st, there are on strike in the Fernie coal district, British Columbia, about 1,200 miners, who are demanding that the single-shift system be introduced in the operation of the mines of the Crow's Nest Pass Collieries. Their action is based on the statement that recent "bumps" in the mines of the locality, while without fatal result very recently, have demonstrated that the lives of the men are in constant jeopardy. The only remedy, they contend, is the introduction of the single shift. In support of their position, they point to the report and recommendations of Prof. George S. Rice, of the United States Bureau of Mines, who made an inspection and submitted a report on conditions in this district for the British Columbia Government.

The walk-out, which affects all the mines of Fernie and Michel, B.C., came suddenly, although there had been talk and agitation for some time before it happened. An understanding, however, had been reached between representatives of District 18, U.M.W. of A. (which includes the eastern section of British Columbia and a part of the Province of Alberta) and Mr. W. R. Wilson, general manager of the Crow's Nest Pass Coal Co., that no drastic step would be taken by the men until the 1st of October, Mr. Wilson promising that he would have his answer by that date as to what course the company would be prepared to take with respect to their demand. The Fernie Union did not consider itself bound by this agreement, however, and declared a strike on September 5th, and called on the district organization for support.

After some preliminary negotiation, which was without result, a conference was arranged to take place in Vancouver, B.C., between Hon. William Sloan, Minister of Mines for British Columbia; Mr. W. H. Armstrong, Director of Coal Operations in District 18; and representatives of the men, the latter including Mr. Thomas Biggs, President of District 18, U.M.W. of A.; Edward Brown, Secretary-Treasurer of the District Organization; and Messrs. Hunter, Potter and Beard. This took place between the 18th and 20th instant, both dates inclusive, all those mentioned attending, with the exception of Mr. Wilson, general manager for the Collieries, who, while in the city, refused to meet the men, maintaining that they had broken faith with him and that, therefore, he did not care to discuss the matter with them in person.

In the course of the conference, Mr. George Wilkinson, Chief Inspector of Mines, was called and gave an account of the steps taken since the submission of Prof. Rice's report for safeguarding the mines against further accident. A more thorough ventilation system had been introduced, with the result that analyses of the air in the return airways showed a reduction of the percentage of methane of from 25 to 75 per cent. Automatic gas detectors of the type approved by the United States Bureau of Mines had been installed and these had detected gas in as small quantities as one-tenth of 1 per cent. The old safety-lamp tests were merely guess work below 2 per cent., so that the automatic detectors were a marked improvement. The company also had agreed not to take out more than 15 per cent. of the coal in the first working, leaving the remainder to be recovered in retreat operations. Coal dust was

being treated by sprinkling and by covering with flue dust.

The men did not dispute the assertion that conditions were much better than formerly, in fact, it was admitted that the improvements indicated had taken place. They insisted, however, that what had been done had not eliminated the "bumps" and declared that this danger could only be met by doing away with the double shift. In the ensuing discussion, doubt was expressed as to whether the single shift, even if secured, would do away with "bumps," which were seismic disturbances peculiar to the Crow's Nest Pass coal field. It was further stated that, in order that warning might be obtained of such movements, a seismograph station was to be installed at Fernie by Mr. F. Napier Denison, the official seismographer for the Dominion Government at Victoria, B.C.

All apparent means of a solution having been exhausted, Mr. Sloan, the Minister of Mines, submitted the following as a basis for settlement on his own responsibility:

"In the interest of the industry and for the purpose of arriving at a quick decision so as to enable the much-needed output of coal to be maintained, I make the following proposals to the miners now idle and to the company involved:

"1. The immediate appointment under authority contained in Section 73 of the Coal Mines Regulation Act of a Commission composed of three members, one chosen by the miners and one by the operators and the third to be appointed by the Lieut.-Governor in Council, on the recommendation of the Minister of Mines, this Commission to immediately proceed to take evidence on the questions involved insofar as they affect any or all mines in Coal Creek and Michel and to be prepared to report within thirty days of their appointment to the Lieut.-Governor in Council, whether, in their opinion, the single shift would be advisable in any or all the mines in said area. The recommendations of this Commission, if any, to be binding on both operators and men until the conclusion of the war.

"2. If the above proposal is satisfactory, I will be prepared, as Minister of Mines, to introduce, at the next session of the Legislature, an amendment to the Coal Mines Regulation Act, calling for one shift in every twenty-four hours for the production of coal throughout the Province of British Columbia, except in cases of national emergency. This amendment to become effective within one year after the conclusion of the war."

This was submitted to Mr. Wilson, the company manager, and accepted, but when it was put to a mass meeting of the miners on strike at Fernie and Michel, was rejected unanimously.

Messrs. Biggs, President of the U.M.W. of A., and Brown, its secretary-treasurer, then submitted a counter proposition to the effect that they would be willing to recommend to the men of the affected section that they return to work on condition that they be given the single shift for the thirty days which would be occupied in the investigation and the preparation of a report by the Commission proposed.

This suggestion has been laid before Mr. Wilson, and it is hoped will be accepted, as the continued inactivity of the miners of the Crow's Nest field, and the possibility of the strike extending throughout the whole district, thus taking some 9,000 miners from work, is causing considerable alarm throughout Canada.

THE HOISTING ACCIDENT AT NANAIMO.

In order that necessary tests may be made to determine the cause of the breaking of the cable used for the lowering and hoisting of men in the protection shaft of the Canadian Western Fuel Co., Nanaimo, B.C., which took place on the morning of the 10th September, with the result that sixteen miners were plunged to their deaths, the inquest was adjourned by Coroner Hickling last Friday evening to the 22nd October. Meanwhile, Wm. Fleet Robertson, Provincial Mineralogist, having been sworn as an official of the Court, will take the broken cable to Eastern Canadian laboratories to supervise "critical microscopic and chemical" examinations and tests of the same. He also is taking samples of water taken from the flow in the shaft, which he will have analyzed to ascertain whether it contains any deleterious matter likely to cause corrosion or other deterioration of the cable and, besides, has been given samples of the oil used in lubricating the rope, which will be treated with the same object. Mr. Robertson will have tests made of the springs used in the operation of the safety clutches, with which the shaft was equipped and which failed in their purpose, the cage, freed of the cable, having travelled unchecked to the bottom.

The inquest, which opened at Nanaimo on the morning of Thursday, the 12th instant, the disaster having occurred on the morning of the 10th, was marked by a clear indication on the part of the authorities to bring out all the evidence, without fear or favor, which might be relevant. Examination of witnesses was conducted by Mr. A. Johnson, Deputy Attorney-General, assisted by Mr. George Wilkinson, Chief Inspector of Mines, while the interest of the Government and of the Department of Mines in particular in seeing that the inquiry should be as thorough as possible, was indicated by the fact that Hon. Wm. Sloan, Minister of Mines, was present in person throughout, and frequently took part in the cross-examination of those called upon to testify. Mr. Johnson, at the outset, declared that he was in attendance, with instructions to have all light that could be obtained shed on the circumstances attending the fatality. With that in mind, he had to ask that the inquest be made as broad as was reasonable in its scope and he hoped that, if there were within hearing any who knew anything that might strike them as being of any importance, they would not hesitate to mention it to him, in order that it might be put on record.

The work of taking testimony then commenced, the scene of the fatality at the bottom of Protection shaft having been visited by the jurors, who had been sworn in on the 10th, within a few hours after it happened. This was continued throughout Thursday and Friday, with an interval on the afternoon of the first-mentioned day, when the funeral took place, it being attended by Hon. Mr. Sloan and other Government and company officials. In all, fifty witnesses were called and examined before adjournment.

James Menzies, rope expert, who is employed by the Canadian Western Fuel Company to make examination at regular intervals of all cables in use in the company's mines, was one of the chief witnesses. He informed the court that he made an inspection of the cables once a week. His last inspection of that which broke was on the 4th of September. On that occasion, as at all times, the cable had been paid out and had

passed through his closely gripped hand for its full length. If there had been any broken strands then they must have been noted either when they struck his flesh or by his eye. He also said that his practice was to inspect the safety clutches and these also, on his last visit, had been in good working order.

Another important witness was C. Wallbank, who, until the 28th of August, was employed by the company to make the daily inspection of cables, etc., required under the terms of Section 91, General Rule 36, of the Coal Mines Regulation Act. On the date indicated, he had left the service of the company. Up to that time he had made the daily inspection required and filed the necessary report. He had never found anything wrong with the rope in question. It appeared, from the evidence of C. Nicholson, that the latter took Mr. Wallbank's place. The former swore that he had inspected the cable and cage, but, on cross-examination, it was found that this inspection was only of fifty feet of the cable from the cage, whereas his daily report would lead to the belief that it extended over its full length.

S. Tembey, the engineer in charge of the operation of the hoisting machinery at the time of the break, swore that he was not using steam or brakes at the moment the cable gave way. Further testimony on this point was given by Wm. Woodman, an engineer of some thirty years' experience, who said that as the rope had broken 157 ft. from the cage and as the shaft is 650 ft. in depth, the cage, when it was let loose, was only approximately one-quarter down, or had travelled but a short part of the trip. He argued from this that there was no need for the application of the brakes; neither he nor any other engineer, would find it necessary at that point to use brakes. This was of importance, it may be explained, because of the possible theory that the snap was the result of the sudden application or restraint on the descending load.

Inspector of Mines, J. Newton, took the stand, but merely stated that he was on his way to make an inspection of the mine from protection shaft on the morning of the accident. He inspected once a month. His practice was, first, to go to the records to find out whether all the required entries had been made. If these showed that the ropes had been inspected as necessary by Statute, they would be accepted by him as accurate.

In the course of the Friday afternoon session, Deputy Attorney Johnson obtained an admission from Mr. Woodman that the latter had heard complaints from the men as to the methods of one of the other engineers in lowering the cage at protection. It had been stated that the miners at times became indignant at the jerky manner in which they were lowered. Mr. Johnson insisted that the witness give the names of the miners who had made these statements; but Mr. Woodman declared that it was unfair that he should be required to give hearsay evidence. It was explained by Mr. Johnson that what he wanted was to secure such information as would enable him to call the men in question. Witness then said that some of them were in Court, and asked them to declare themselves. One did so, but there were no further volunteers. On the suggestion of Mr. Sloan, the doors were closed and all miners who descended Protection shaft present were put on the stand and sworn. From some of these, it was established that there were complaints from time to time because of the jolting of the cage, in some instances, it being stated that it was so roughly

handled that the men were almost thrown off their feet.

Before adjournment, Mr. Fleet Robertson was sworn and charged by Coroner Hickling as follows:

"I hand to you Exhibit 7, which is a bottle of water taken from the shaft of the Protection Mine, under the supervision of Mr. Devlin, acting for the Government, and Mr. Garman, acting for the company. I ask you to take this to Montreal and have it analysed and see whether it contains any deleterious matter which would be liable to affect the strength of the cable. I will ask you to be present at the examination of this water and to bring the results of the examination and any unused portion of the water back with you, when you are next called upon to give evidence at this inquest.

"I also hand to you Exhibit No. 9, which is a sample of oil used by the Canadian Western Fuel Co. for oiling the rope attached to the cage in question." Mr. Robertson then was requested to take this to Montreal, that the same tests might be made for the same purpose.

"These are some parts of cable," the Coroner continued, "which I give into your possession. You will take these to McGill University, Montreal, or some other institution with the necessary laboratory equipment, for the purpose of having the same tested and a critical chemical and microscopic examination made of the fractured ends, in order to ascertain, if possible, what caused the rope to break. It will be necessary to obtain an exhaustive examination of this rope to know whether its efficiency had been impaired in any way, and, if so, to ascertain the cause of such impairment, and I request that the ropes be subjected to all practical strains and tests, in order to arrive at your conclusion. I would ask you to attend at these tests.

"Another exhibit, being the springs attached to the clutches in question on the 10th of September, will be placed in your charge for testing, but these have been unavoidably detained at the bottom of the shaft and will come into my possession to-morrow, when they will be given you. I would ask you to be good enough to take these springs and have them tested, in order to ascertain whether or not their efficiency has been impaired.

"And now, Mr. Robertson, I fully realize the responsibility I am imposing on you, knowing the important position you have with regard to the Provincial Government, and I know that you will fulfill the duties I impose upon you to the best of your skill and knowledge, and that you will in due course return with the results of the investigation when you are next called upon to give evidence at this inquest."

License Needed for the Export of Silver.

Export of Canadian silver coin, silver bullion and fine silver bars is prohibited except under license issued by the Minister of Finance, according to Ottawa advice. The regulations are to provide that licenses shall be issued only where the silver is to be used for civil or military purposes of importance in connection with the war and only in cases where the exporter certifies that it has been purchased at a price which does not directly or indirectly exceed \$1.01½ per ounce, 1,000 fine, at the point where the silver is refined or at the point of importation in the case of imported silver. The order-in-council states that serious difficulties have arisen in connection with the purchase of silver which is urgently required for coinage by the allied governments and recites the steps taken by the United States and British Governments.

THE E. & N. RAILWAY CO.'S LANDS, VANCOUVER ISLAND, B.C.

The question of the joint administration of all minerals in the E. & N. Railway Co.'s lands on Vancouver Island, with the exception of gold and silver, which alone are vested solely in the Province, was taken up with Lord Shaughnessy, President of the Canadian Pacific Ry. Co., by Hon. William Sloan, Minister of Mines, at Vancouver, B.C., on Thursday, the 19th instant, with results which Mr. Sloan considers very satisfactory.

Mr. Sloan found that the President of Canada's great railway corporation was thoroughly conversant with the situation and that he was prepared to agree with the position taken by the Department of Mines, and unanimously endorsed by the Legislature of British Columbia at its last session, that the present system of mineral control within the area owned by the Island Railway was most satisfactory from a public standpoint.

With Lord Shaughnessy, the Minister of Mines reviewed the situation, pointing out that, because of the existing dual control, the development of the mineral resources of the 3,296.9 square miles of railway land on the Island was being seriously retarded. He emphasized the fact that, owing to the complications likely to arise in the securing of title to minerals other than gold and silver in this section, prospectors were not inclined to go into the field within its limits. The difficulties were aggravated, it was pointed out, by the fact that where gold and silver was discovered on the Island, the ore usually, in fact almost invariably, contained other minerals. For the encouragement of prospecting in the E. & N. Belt, and in the interests of the mining industry of this part of the Province, therefore, it was desirable that there should be some understanding between the Province and the Railway Company as to the development of resources known to exist, but hitherto practically untouched in an economical sense.

Lord Shaughnessy listened to these representations sympathetically and admitted that the situation was not desirable. He intimated that officials of the company would be deputed to enter into negotiations with Mr. Sloan, having in view the arriving at a decision which would be mutually satisfactory.

At the recent annual meeting of the Rambler-Cariboo Mining Co., one of the producing mines of the Slocan District, British Columbia, it was stated by Mr. A. P. McClaine, president, that the company had a surplus of \$29,120 on August 3, and that the ore at the smelter, in transit and ready for shipment by September, is valued at \$21,000. He continued: "We have found little clean ore in our recent operations, so that the output next year is likely to be confined mainly to ore of a milling grade. We have been able to operate the mill on a basis of only a shift a day because of the shortage of mill men and, under these circumstances, the profits have been light, running about \$2,000 a month. We are trying to buy a locomotive for the transportation of men and materials in the tunnel. Speed in transportation has become an essential since the hours of labor are limited to eight hours from portal to portal. Mr. McClaine was re-elected president; Mr. Alfred Coolidge, secretary-treasurer; W. A. Cameron, superintendent; while the Board is composed of the foregoing together with Messrs. H. Coldwell, Jackson Armstrong, Charles F. Mackenzie and the Rev. P. F. Hylebos and Dr. J. F. Hall.

Mineral Production of British Columbia

By E. Jacobs.

The Annual Report of the Minister of Mines for British Columbia for the calendar year 1917, issued recently, includes the revised figures of mineral production in that Province for that year.

In the review that follows the figures showing quantities of minerals produced, rather than those of value, are used, so that the actual production of minerals may be given prominence rather than that of value, the latter being subject to fluctuations of prices and so not constituting as fair a basis for comparison.

An instance of the way in which comparisons of value only fail to convey a fair idea of the relative importance of the actual production of minerals in different years may be found in the first paragraph of official comment under the head of Progress of Mining, in the Annual Report under notice. That paragraph reads: "The gross value of the mineral production for 1917 was \$37,010,392, a decrease from that of the year 1916 of \$5,280,070, or 12.5 per cent., but an increase over that of the previous year 1912 of \$4,569,592, or 14 per cent. The gross value of the metallic minerals recovered in 1917 was \$27,284,474, which represents a decrease from last year of \$4,779,040, a percentage decrease of about 15 per cent."

larger than in 1917 in all but copper and zinc. The comparison between production in 1916 and 1917 is also fairly shown. It may be added that had the same prices been used in calculating the value of the production of 1917 as were used for that of 1912 there would have been a difference of more than \$4,500,000 in favor of 1912 instead of, approximately, that sum against the earlier year, which suggests that comparisons of yearly results with fluctuating value are not reliable as indicating progress or the reverse, while the use of quantities shows much better the actual position. Accordingly, wherever practicable, quantities are used in making comparisons that follow, which cover a total of twenty years, in 4-year periods (taking Table IX of the Annual Report as an example of a 4-year comparison), and, as well, give opportunity to compare earlier periods of similar length with that affected directly by the War.

Details of production (quantities and value) for the four years, 1914-1917, are given in the next following table:

Placer Gold.—The yield of placer gold in 1917 was the smallest for any year since 1911, when it was 21,300 oz., as compared with 24,800 oz. in 1917. That

QUANTITIES AND VALUE OF MINERAL PRODUCTS FOR 1914, 1915, 1916 and 1917

	1914		1915		1916		1917	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Gold, placer.....oz.	28,250	565,000	38,500	\$770,000	29,025	\$ 580,500	24,800	\$496,000
Gold, lode.....oz.	247,170	5,109,004	250,021	5,167,934	221,932	4,587,334	114,523	2,367,190
Total gold.....		\$5,674,004		\$5,937,934		\$5,167,834		\$2,863,190
Silver.....oz.	3,602,180	1,876,736	3,366,506	1,588,991	3,301,923	2,059,739	2,929,216	2,265,749
Lead.....lb.	50,625,048	1,771,877	46,503,590	1,939,200	48,727,516	3,007,462	37,307,465	2,951,020
Copper.....lb.	45,009,699	6,121,319	56,918,405	9,835,500	65,369,364	17,784,494	59,007,565	16,038,256
Zinc.....lb.	7,866,467	346,125	12,982,440	1,460,524	37,168,980	4,043,985	41,848,513	3,166,259
Total value, metalliferous.....		\$15,790,061		\$20,762,149		\$32,063,514		\$27,284,474
Coal.....tons, 2,240 lb.	1,810,967	6,338,385	1,611,129	5,638,952	2,084,093	7,294,325	2,149,975	7,524,913
Coke.....tons, 2,240 lb.	234,577	1,407,462	245,871	1,475,226	267,725	1,606,350	159,905	959,430
Miscellaneous products.....		2,852,917		1,571,181		1,326,273		1,241,575
Total value of production.....		\$26,388,825		\$29,447,508		\$42,290,462		\$37,010,392

In order that the actual mineral production—that is, quantities, not value—of the three years mentioned in that comment may be readily seen and fairly compared, the following table is presented:

	1912.	1916.	1917.
Placer gold.....oz.	27,775	29,025	24,800
Lode gold.....oz.	257,496	221,932	114,523
Total gold.....	285,271	250,957	139,323
Silver.....oz.	3,132,108	3,301,923	2,929,216
Lead.....lb.	44,871,454	48,727,516	37,307,465
Copper.....lb.	51,456,537	65,379,364	59,007,565
Zinc.....lb.	5,358,280	37,168,980	41,848,513
Coal, gross, tons of 2,240 lb.	3,025,709	2,485,580	2,398,715
Coal, net, tons of 2,240 lb.	2,628,804	2,084,093	2,149,975
Coke, tons of 2,240 lb.	264,333	267,725	159,905
Miscellaneous products.....	\$3,435,722	\$1,326,273	\$1,241,575

These figures make it plain that in the year 1912 quantities of minerals produced were substantially

of the intervening years was 27,775 oz. in 1912, 25,500 oz. in 1913, 28,250 oz. in 1914, 38,500 oz. in 1915, and 29,025 oz. in 1916.

Going back over twenty years and comparing yields of periods of four years each, the following results are shown: For 1898-1901, 211,853.5 oz.; for 1902-1905, 210,908 oz.; for 1906-1909, 145,020 oz.; for 1910-1913, 101,575 oz.; and for 1914-1917, 120,575 oz. It will be seen that while in the first of these four-year periods the average yearly yield was 52,963 oz., that for the last four years was only 30,144 oz. A comparison with years prior to 1880 would show a much larger decrease in recent years than that just indicated.

The grand total of value of placer gold for all years since production was begun in 1858 is on official record as having been \$75,116,103, which calculated at \$20 an ounce would represent 3,755,805 oz. for 60 years, 1858-1917. In that long period the yearly yield ranged from a maximum of \$3,913,563 in 1863 down to a minimum of \$356,131 in 1893. No records are at hand to show the proportions of the several placer gold fields, but it is probable that more than one-half of the total quantity recovered in all years came from Cariboo dis-

trict. In late years, however, Atlin, division of Cassiar district, has been in the lead, as is shown in the following table:

Year.	Cariboo District.		Cassiar District.	
	Cariboo.	Omineca.	Atlin.	Other parts.
1914	10,000	300	16,100	1,150
1915	15,000	600	18,850	1,450
1916	8,900	850	16,925	1,100
1917	7,500	600	15,250	350
	41,400	2,350	67,125	4,050

The yield from all other parts of the Province for the four years totalled only 5,650 oz., against 43,750 oz. from Cariboo district and 71,175 oz. from Cassiar district.

Lode Gold.—The output of lode gold in 1917 was 114,523 oz., compared with 221,932 oz. in 1916, 250,021 oz. in 1915, and 247,170 oz. in 1914. Taking 4-year periods for twenty years, they compare as follows: For 1898-1901, 625,913 oz.; for 1902-1905, 930,024 oz.; for 1906-1909, 914,012 oz.; for 1910-1913, 1,026,068 oz., and for 1914-1917, 833,646 oz. If to these amounts be added 215,086 oz. for the five years 1893-1897, a grand total of 4,544,749 oz. will be obtained, and this is the quantity the official records show to have been produced in all years to the end of 1917.

The 1917 production of individual districts was: Of Boundary-Yale, 60,010 oz.; Rossland, 33,290 oz.; Skeena, 9,805 oz.; Coast (Southern), 3,793 oz.; Lillooet, 3,092 oz.; Nelson, 2,521 oz.; Atlin, 1,000 oz.; Omineca, 931 oz., and all others, 81 oz. Of the Boundary-Yale production, about 37,000 oz. was the output of the Hedley Gold Mining Co.'s mine in Similkameen district, and 1,466 oz. that of other parts, including Nicola, Ashcroft, and Kamloops, probably the last-mentioned in largest part.

Silver.—The output of silver in 1917 was 2,929,216 oz., compared with 3,301,923 oz. in 1916, 3,366,506 oz. in 1915, and 3,602,180 oz. in 1914. For the several 4-year periods of the last twenty years the comparison is: For 1898-1901, 16,341,322 oz.; for 1902-1905, 13,576,019 oz.; for 1906-1909, 10,899,841 oz.; for 1910-1913, 10,940,569 oz., and for 1914-1917, 13,199,825 oz. There was an increase for the last 4-year period as compared with the two periods immediately preceding, but a considerable decrease as compared with that of 1898-1901. The official records show that the production of silver was commenced in a very small way in 1887 and that during 11 years, to 1897 inclusive, the total output was 11,380,964 oz. The grand total of production for all years is 76,338,540 oz.

The 1917 production of individual mining divisions and districts was: Of Sloean and Sloean City divisions, 1,547,576 oz.; Skeena division, 343,805 oz.; Boundary-Yale district, 227,208 oz.; Ainsworth division, 224,461 oz.; Fort Steele division, 180,168 oz.; Coast (Southern) district, 112,652 oz.; Omineca division, 82,311 oz.; Windermere-Golden division, 79,685 oz.; Trail Creek division (Rossland), 47,112 oz.; Nelson division, 46,229 oz., and all others, 38,009 oz. It will be seen that the proportion of Sloean district was nearly 53 per cent. of the whole. The production of East Kootenay district, which includes Fort Steele, Golden, and Windermere divisions, was 259,853 oz., while that of West Kootenay district, embracing Ainsworth, Sloean, Sloean City, Nelson, Trail Creek, Revelstoke, Trout Lake, and

Lardeau divisions, was 1,903,111 oz., or nearly 65 per cent. of the output of the whole province.

The mines making the larger individual productions were the Standard, with an output of about 500,000 oz., and the Surprise and Queen Bess, each about 200,000 oz. These three mines are situated in Sloean mining division.

It is of interest to note that official records show the total production of silver in the year 1897 to have been 5,472,971 oz., in 1898, 4,292,401 oz., and in 1901, 5,151,333 oz.

Official comment for 1917 is to the effect that about 75 per cent. of the total Provincial output of silver comes from the treatment of silver-lead-zinc ores, and the remainder mainly from the smelting of gold-copper ores also containing silver.

Lead.—The output of lead in 1917 was 37,307,465 lb., compared with 48,727,516 lb. in 1916, 46,503,590 lb. in 1915, and 50,625,048 lb. in 1914. For the several 4-year periods since 1897 the figures compare as follows: For 1898-1901, 168,497,522 lb.; for 1902-1905, 133,852,611 lb.; for 1906-1909, 187,738,999 lb.; for 1910-1913, 161,767,274 lb., and for 1914-1917, 183,163,619 lb. The production of the last-mentioned 4-year period was only once exceeded since the mining of lead was commenced in the Province, namely, in that of 1906-1909, as shown above. The total of the output of lead in all years prior to 1898 was 89,166,942 lb., and the grand total for all years from 1887 to 1917, both inclusive, is 924,186,967 lb.

West Kootenay district mines made a total production in 1917 of 21,204,356 lb., or nearly 57 per cent. of the whole of the output of the Province. The proportions of the several mining divisions in this district were: Of Sloean and Sloean City, 11,808,019 lb.; of Ainsworth, 6,395,350 lb.; of Nelson-Arrow Lake, 2,605,666 lb., and of Revelstoke-Trout Lake-Lardeau, 395,321 lb. The production of mines in East Kootenay district totalled 15,771,289 lb., or rather more than 42 per cent. of the Provincial total. Of this quantity, 13,996,640 lb. was from Fort Steele division, and 1,774,649 from Windermere and Golden divisions. From Omineca division there came 271,885 lb., and from various other parts of the Province not already stated, 59,935 lb.

The Sullivan mine made the largest individual output of lead of all mines in the Province, nearly all of the production from Fort Steele division of East Kootenay having come from that mine. The Paradise mine, in Windermere division, produced about 1,200,000 lb. In Sloean division of West Kootenay, the Standard mine made the biggest output, with the Surprise, Galena Farm, and Queen Bess mines next in order as regards quantity produced. In Ainsworth division the Bluebell made an output of about 3,500,000 lb., the Highland about 1,000,000 lb., and the Florence 900,000 lb. In Nelson division, the Emerald was the largest producer, its output having been practically the whole made in the division. In Omineca division, the Silver Standard made by far the largest output of the several shippers from that part of the Province.

Copper.—The output of copper in 1917 was 59,007,565 lb., compared with 65,379,364 lb. in 1916, 56,918,405 lb. in 1915, and 45,009,699 lb. in 1914. The totals for 4-year periods compare as follows: For 1898-1901, 52,595,095 lb.; for 1902-1905, 137,398,357 lb.; for 1906-1909, 176,695,067 lb.; for 1910-1913, 173,088,432 lb., and for 1914-1917, 226,315,033 lb. Official records show that the production of copper was commenced in the

Province in 1894 and that during the years 1894-1897 a total output of 10,421,256 lb. was made. The grand total for all years, 1894-1917, both inclusive, is shown to have been 776,513,240 lb.

District or division proportions of the 1917 output of copper were as follows: Skeena division, 27,978,015 lb.; Coast (Southern) district, 17,256,534 lb.; Boundary-Yale district, 11,117,290 lb.; Trail Creek (Rossland) division, 1,730,088 lb.; Omineca division, 852,373 lb., and all others, 73,265 lb.

More than one-half of the total production of copper in the Province in 1917 was from the Granby Consolidated Co.'s mines, its Hidden Creek mines, near Anyox, Observatory inlet, having made an output of 27,661,301 lb., and those at Phoenix, Boundary district, of 6,858,718 lb., together, 34,520,019 lb. Other copper producers in Boundary district were the Canada Copper Corporation, from its mines near Greenwood, and the Consolidated Mining and Smelting Co., from the Emma mine. In the Coast (Southern) district, the Britannia is credited with an output of 15,780,830 lb., with the Marble Bay mine, on Texada island, next, but with only a comparatively small output. Rossland mines show a considerable falling off, with an output of only 1,730,088 lb., compared with 4,200,745 lb. in 1916, 4,651,681 lb. in 1915, and 3,779,830 lb. in 1914.

It is noted, officially, that "During the last three years copper-mining has attained the position of being the most important form of mining in the Province of British Columbia, and from all indications it should maintain this prominent place for years to come, as last year the value of the copper mined exceeded the total value of all other metalliferous minerals mined in the Province, and was also nearly double the combined value of coal and coke production. It formed about 60 per cent. of the total mineral production. In the working of the large, low-grade copper deposits and the subsequent smelting of the ores produced, a great number of men are employed and a large proportion of the money value is retained in the country in the payment of wages and purchase of supplies."

Zinc.—The output of zinc in 1917 was 41,848,513 lb., compared with 37,168,980 lb. in 1916, 12,982,440 lb. in 1915, and 7,866,467 lb. in 1914. Although there was some zinc produced prior to 1909, no record of the quantity appears in the tables printed in the Annual Report, but for that year an output of 8,500,000 lb. is recorded. For the 4-year period 1910-1913 the total was 18,935,784 lb., and for that of 1914-1917, 99,866,400 lb. The grand total of production for all years, 1909-1917, is shown as 127,302,184 lb.

The 1917 production from East Kootenay district was 20,733,090 lb., of which 20,715,090 lb. was from Fort Steele division, and the remaining 18,000 lb. from Golden division. West Kootenay mines produced 20,723,762 lb., the proportions of several of the divisions having been: Slocan, 18,789,573 lb.; Nelson, 982,309 lb.; Ainsworth, 918,601 lb., and other divisions of the district, 33,279 lb. The Highland Valley Co.'s mine, in Ashcroft mining division, probably produced the remaining 27,564 lb., making up the comparatively small quantity from other parts of the Province.

In the Annual Report it is stated that in the Slocan district the heaviest shipper in 1917 was the Standard mine, with an output of about 10,700,000 lb. of zinc, followed by the Lucky Jim and the Surprise, each with about 2,000,000 lb.; then the Galena Farm, Van-Roi, and Slocan Star. The Fort Steele production came entirely from the Sullivan mine, the ore from which

was shipped to the electrolytic refinery at Trail. The Nelson division production was a zinc-carbonate ore shipped from the Hudson Bay group of mines near Salmo, to United States smelteries for treatment. The Ainsworth division production was mainly from the Bell and Whitewater mines, each with an output of about 400,000 lb. That from Omineca division was hand-sorted ore from the Silver Standard mine, shipped to the United States.

Other Minerals.—The information given in the Annual Report under this subhead does not record much production. It is stated that "the production of miscellaneous minerals produced in British Columbia in 1917 was valued at \$37,029. "It is gathered that about \$1,700 worth of crude platinum recovered in the Similkameen district" (which includes Tulameen) "was included in the placer output," presumably the placer-gold output. Excerpts from the commend under this subhead follow:

"It has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron-smelting plant somewhere on the British Columbia Coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established. As is well known there is, on the Coast, in the aggregate, an adequate supply of magnetite-iron ore, quite sufficiently free from impurities as to be within the 'Bessemer limit,' to supply ore for such a plant."

"A small quantity of crude platinum is recovered each year from placer-mining operations in Similkameen district. . . . The occurrence of small quantities of platinum in-place in the periodotite rocks of the Upper Tulameen river has been known of for years; and . . . prospecting has been resumed to see if any zones in this formation can be found which would pay to work for the platinum content."

"The actual Provincial output of molybdenite during the year was 152 tons of ore, containing about 12,000 lb. of molybdenite. Nearly all the production was from the Molly group, on Lost creek, in Nelson mining division. . . . The Lost Creek property has several thousand tons of from 2 to 4 per cent. ore, so that, with a suitable mill, a steady production could be maintained. . . . Another property, on Alice arm, in Skeena mining division, is reported to have a large showing of molybdenite. A mill was erected on the property in 1916 and about 383 tons of 2 per cent. ore was treated. Other prospects in Nelson, Kamloops, and Lillooet mining division have been investigated, but as yet none of them have assumed any great importance."

"Near Kaslo (West Kootenay) a manganese deposit has been developed during the past year and there is said to be a considerable tonnage ready for shipment."

"So far as is known, no tungsten ore has been produced in shipping quantities from the Province, but tungsten minerals, generally in association with other minerals, have been noted in a few localities. A deposit of scheelite (calcium tungstate) has been known of for many years, situated near Barkerville, Cariboo district."

"Antimony . . . is a common mineral in British Columbia, occurring in association with lead and zinc ores. It does not, however, as a rule, occur in large quantities, but attempts are now being made in a few places to sort it out from its associated minerals. In 1916, 27 tons of antimony ore were shipped from the Alps-Alturas property, situated in Slocan mining divi-

sion; this ore contained from 50 to 60 per cent. antimony."

"Small deposits of chromite occur in Tulameen district, but so far have been considered too small to be developed. A deposit near Cascade, Grand Forks mining division, is now being developed and other occurrences are being prospected."

"In 1917, 105 tons of talc was shipped from Lillooet district and an increasing production may be expected. Several hundred tons of epsomite (magnesium sulphate) was shipped from Osoyoos division."

"For the first time in the history of the Province there was a production of arsenic; this was made from the Hedley Gold Mining Co.'s Nickel Plate mine and amounted to \$20,000. The arsenic occurs as arsenical iron pyrites in the concentrates shipped by this company to the Tacoma smeltery. Concentrates have been going to the smeltery for years, but until the recent installation of an arsenic-burner the arsenic content was not recovered."

The total value of "miscellaneous minerals, etc.," for all years up to and including 1917, is shown in the Annual Report to have been \$554,448. This includes a lot of iron ore which, years ago, was shipped to smelting works from Cherry creek, Kamloops mining division, for use as a flux.

Coal and Coke.—The gross production of coal in 1917 was 2,398,715 tons of 2,240 lb., compared with 2,485,580 tons in 1916, 1,972,580 tons in 1915, and 2,166,428 tons in 1914. The quantities made into coke in the several years were: In 1917, 248,740 tons; in 1916, 401,487 tons; in 1915, 361,451 tons, and in 1914, 355,461 tons. Net quantities of coal were: In 1917, 2,149,975 long tons; in 1916, 2,084,093 tons; in 1915, 1,611,129 tons, and in 1914, 1,810,967 tons. Following the official custom in the Province, credit is taken for the coal "lost in washing, etc.," as well as that "used under companies' boilers, etc." In 1917, that "lost in washing" amounted to 226,430 tons, and that used under colliery boilers, etc., to 198,102 tons.

The totals of net coal (that is, after deduction of that made into coke) for 4-year periods are as follows: For 1898-1901, 5,342,115 long tons; for 1902-1905, 5,203,528 tons; for 1906-1909, 7,001,695 tons; for 1910-1913, 9,759,395 tons, and for 1914-1917, 7,656,164 tons. Official records show that coal-mining was commenced in 1836 and that production of coal for all years prior to 1898 totalled 12,081,687 tons, which, added to the total for 20 years, 1898-1917, makes a grand total of 47,044,584 tons net produced.

The following table, copied from the Annual Report, show the proportions of production of coal and coke by the several districts in the Province during the last four years, in tons of 2,240 lb.:

Mines of	1914	1915	1916	1917
Coal—				
Vancouver Island	1,072,314	1,020,942	1,492,761	1,695,721
Nicola & Similkameen ..	138,931	99,066	110,549	151,243
Crowsnest	955,183	852,572	882,270	551,751
Total quantity of coal mined	2,166,428	1,972,580	2,485,580	2,398,715
Less made into coke..	355,461	361,451	401,487	248,740
Net quantity of coal produced	1,810,967	1,611,129	2,084,093	2,149,975
Coke—				
Vancouver Island ....	.....	5,450	27,604	30,406
Crowsnest	234,577	210,421	240,121	129,499
Total quantity of coke produced	234,577	245,871	267,725	159,905

The totals of coke production for 4-year periods are as follows: For 1898-1901, 281,481 long tons; for 1902-

1905, 803,771 tons; for 1906-1909, 928,242 tons; for 1910-1913, 834,412 tons, and for 1914-1917, 908,078 tons. Coke-making was commenced in the Province in 1895; in three years, 1895-1897, there was made 19,396 tons. The grand total for all years is 3,775,380 tons.

A general idea of where the coal and coke produced in British Columbia is consumed can be gained from the following statement relative to 1917: Coal sold for consumption in Canada, 935,469 long tons; for export to the United States, 754,568 tons; for export to other countries, 38,211 tons; total, 1,728,248 tons. Coke sold for consumption in Canada, 147,811 long tons; for export to the United States, 12,711 tons; total, 160,522 tons. The small difference between the totals of production and sales of coke is accounted for by what was taken from stock.

Building Materials.—The total value placed on the structural materials produced in 1917 is \$1,204,546, in the following proportions: Portland cement, \$587,829; lime and limestone, \$102,223; building stone, \$113,275; riprap, \$28,170; crushed rock and flux, \$138,830; sand and gravel, \$61,642; pottery and clay, \$81,728; fire, face, and red brick, \$190,849; total, \$1,204,546. Figures are not at hand for a comparison of 1917 production with that of preceding years, except as appearing in the general table of production for four years, 1914-1917. The total value of building materials, etc., for all years is given in the Annual Report as \$27,902,381.

Official comment on the 1917 production includes the following: The production of building materials in 1917 was slightly less than in the preceding year, having been \$1,204,546, as compared with \$1,299,553. Since 1912, when a production amounting to \$3,435,722 was recorded, the output of building materials has steadily declined, due to the cessation of the building trade, brought about by the continued financial depression and the war. It is probable that the figures have now reached a minimum, and that an output amounting to from \$1,000,000 to \$1,500,000 represents the steady yearly demand for these materials for use in repairs, renewals, and various small demands, without any new construction work. . . . The outputs of sand and gravel, of brick and pottery, are all slightly less than in 1916, but the decrease is not serious. The outputs of fire and face brick and cement show an increase. . . . Approximately 88 per cent. of the total production of building materials comes from the Coast district, and the larger part of this finds its markets in the Coast cities.

The production of portland cement in the Province is made by two companies, namely, the Vancouver Portland Cement Company, with works at Tod inlet, and the Associated Cement Company, with works at Bamberton, both in Victoria division in the southern part of Vancouver island. The combined production for 1917, valued at \$487,829, compares with \$436,459 in 1916.

It is stated that nearly \$100,000 worth of limestone (included in the item "crushed rock and flux") was quarried for use as flux in the respective smelting works of the Granby Consolidated Co. at Anyox, and the Consolidated Mining and Smelting Co. at Trail.

Total Value of Production.—The Annual Report shows the total value of the mineral production of the Province for all years, 1852 to 1917, inclusive, to have been \$595,571,107. For all years to 1897, inclusive, the total was \$112,510,465; that for later 4-year periods was as follows: For 1898-1901, \$59,731,523;

for 1902-1905, \$76,421,188; for 1906-1909, \$99,157,408; for 1910-1913, \$112,613,336, and for 1914-1917, \$135,137,187.

The proportions of value of the different minerals were: Of placer gold, \$75,116,103; of lode gold, \$93,717,974; of silver, \$43,623,761; of lead, \$39,366,144; of copper, \$130,597,620; of zinc, \$10,379,018; of coal and coke, \$174,313,658; of building stone, bricks, etc., \$27,902,381, and of miscellaneous minerals, \$554,448.

The Columbia Mines Company's Operations on Pine Creek.

The Gold Commissioner for Atlin, B.C., in his report for 1917 respecting operations on Pine Creek of that District, says: "On Pine Creek the Columbian Mines Company, representing the North Columbia Gold Mining Company, the Pine Creek Power Company, and the Atlin Consolidated Mining Company, under the general management of Paul W. Greyer, with a force of between 40 and 45 men, operated at two points on the south side of the creek, besides carrying on drifting operations on the Atlin Consolidated Mining Company's ground on the north side."

These operations since have ceased. Certain judgments were secured against the company, and a considerable part of its holdings were offered for sale by the sheriff for the satisfaction of judgment creditors. It is alleged that fifty-two gold placer claims, a number of mineral claims, a lake dam, ditches and water system, blacksmith's shop, machine shop and equipment, engines, boilers, machinery, a telephone system, electrician's shop and supplies and "one certain Ford automobile" changed hands for sheriff's charges, a matter of \$62 odd. The holdings, plant, etc., have a value running well into the thousands of dollars, and their sale at such a ridiculously low a figure caused considerable comment in Atlin. It is pointed out, on the other hand, that the purchaser and his associates have unsatisfied claims against the company of a substantial character. It appears that there are a number of miners in the District to whom the company owes back pay for labor performed, and the new owners, no doubt recognizing their right to consideration, granted several of them a lay on the ground thus acquired, the terms being that they should pay all expenses of operation in return for 75 per cent. of the gold recovered. Not all of those to whom wages were due and unpaid, however, obtained this privilege, according to reliable report. Consequently, there was no little dissatisfaction. However, those who were granted the lay, went to work and in a short time made a rather tidy clean-up, the gold being shipped to the Coast. In the meantime, Messrs. Tallmire and Wesche, the former of whom is reported to also have a claim against the company, staked claims which were being worked by the lay-men. Mr. Tallmire, in taking the oath necessary in the process of recording under the British Columbia Placer Act that "the said land is at present **unoccupied** for placer-mining purposes," made affidavit that his understanding of the word "unoccupied" was that it was "unoccupied" in a legal sense. Following this, Messrs. Tallmire and his partner were charged with perjury, committed for trial, and their hearing is to take place at an early date. Meanwhile, the historic gold mining camp of Atlin is astir over the affair, and its development is being closely watched throughout the Province. The unfortunate position of the company, which has been forced to close down and whose property and plant has thus been dis-

posed of, is a commentary on the conditions which gold producing concerns find confronting them because of the fixed value of their product while that of other minerals soars and labor and other expenses increase.

PERSONAL

Mr. D. B. Dowling, president of the Canadian Mining Institute, expects to return to Ottawa from the West about October 12th.

Mr. Reginald E. Hore has returned to Toronto from Nova Scotia.

Mr. F. W. Gray, who recently joined the staff of the Nova Scotia Steel & Coal Co., Ltd., is now at New Glasgow.

Mr. Thos. J. Brown has been reappointed general superintendent of Nova Scotia Steel & Coal Co., Ltd.

Mr. Gerald Murphy, of the Technical College, Halifax, has been granted leave of absence and is now on the staff of the Nova Scotia Steel & Coal Co., Ltd.

Fraser & Chalmers of Canada, Ltd., of Montreal, Que., have been awarded a contract by the Corporation of the town of Pointe Claire, Point Claire, Que., for a 1,500-gallon centrifugal pump direct connected to a Sterling gasoline engine.

Mr. P. Kirkgaarde is building an electric smelting plant at Cordova Mines for the production of ferrochrome.

Mr. H. Vassiliadi, of London, Eng., was in Toronto recently en route to Kirkland Lake.

Mr. E. Jacobs is in Phoenix, Arizona.

VISITING HERB LAKE GOLD FIELD.

The Pas, Man., September 13.—Commissioner J. A. Campbell returned on Sunday last from his trip to Port Nelson and Churchill, accompanied by his brother, C. N. Campbell, superintendent of the Granby Mine at Phoenix, B.C. They took the Ross Navigation Co. boat on Tuesday evening for Sturgeon Landing, and then on to the mining regions at Athapapuskow and Schist Lakes. After giving that district a look-over they will return to The Pas and take gasoline car to Mile 82 on the H.B.R. line, where they will trail in to Herb Lake gold fields on a visit.—The Pas Herald.

PICTOU STRIKE SETTLED.

New Glasgow, N.S., Sept. 27.—The miners' strike at the Pictou county collieries is settled. The operatives go to work next Monday, accepting an advance of 20 cents per day in wages. The acceptance was based on the balloting to-day, which resulted in an overwhelming majority of "yeas" at the three mines—Drummond, Acadia and Thorburn. The committee to investigate the high cost of living as it affects the miners will be appointed to-morrow, the chairman to be chosen by the Trades and Labor Council. The other two members, one to represent the men and the other the companies, will be elected.

The Mining Department of the Sudbury High School offers a practical technical education in the subjects related to the mining industry. The course includes mathematics, surveying, drafting, chemistry, physics, mineralogy, geology, mining, metallurgy and extends over a period of four years. While this course admits to any department of the Faculty of Applied Science of Queen's University, it is intended chiefly for the boy who will not go to college.

SPECIAL CORRESPONDENCE

**NORTHERN ONTARIO.
New Manager for Beaver.**

Mr. J. W. Moffet, who for many years has managed operations at the Beaver mines here, has tendered his resignation to the company, owing to ill-health. The management of this property is more than ordinarily strenuous owing to the fact that the Beaver company, as well as operating the parent property at Cobalt, controls and operates the Kirkland Lake Gold Mines, Limited, at Kirkland Lake. At the latter property a mill is nearing completion while underground upwards of \$800,000 in gold is blocked out. At the Beaver property in Cobalt, results of development work during the past few months have proven highly gratifying to the management, and it is anticipated the company has a number of years' successful operations still ahead of it. Mr. L. W. Ledyard, who has had a fitting experience in mining in the north country, has been appointed to the position of manager of the Beaver and the Kirkland Lake mines. Mr. Ledyard was for a considerable time connected with the Buffalo Mining Company at Cobalt and later with the Teck-Hughes at Kirkland Lake, where, until early in the present year, he occupied the position of manager, thus gaining an intimate knowledge of both districts in which the Beaver company are at present operating properties.

Kerr Lake.

During the month of August the Kerr Lake Mining Company produced upwards of a quarter of a million ounces of silver, which compares with 231,000 ounces during July. With the exception of the month of July the August output was the highest in the history of the company. The fiscal year of the Kerr Lake ended on August 31st. During this period upwards of 2,575,000 ounces of silver was produced. Owing to the high price prevailing for the white metal during the past year it is quite apparent the company's earnings have exceeded all previous records.

Nipissing.

Production at the Nipissing Mines for the month of August was considerably retarded owing to the fact that the aerial transmission line conveying ore from the Meyer and Fourth of July shafts to the mill on the east side of Cobalt Lake being out of commission for about ten days. This accident necessitated the treating of ore from other portions of the property, which was of a lower grade, and considerable inconvenience was otherwise experienced. The trouble was speedily overcome and the mine is operating at full capacity.

Development Work at Dome Mines.

A force of about sixty men are engaged in development work at the 1,250-ft. level of the Dome Mines, where an important development crosscut is being driven to the east and a great underground roadway built for the haulage of ore which has been indicated in the diamond drilling programme carried out by the company some time ago. If ore is found to continue in the same volume to the depths now indicated on the property at the first few levels, a great and prosperous future is in store for the Dome Mines. In the neighborhood of ten millions of dollars in gold has been developed in the Dome Mines above the seven-hundred-foot level, and the present point of operation is almost double the depth of these workings. The closing down of the large mill at the property, owing to the scarcity of labor, was a discouraging event to the shareholders, but in view of the present economic conditions, this step will ultimately work out to the benefit of the

shareholders. At the beginning of the current year the books of the company showed a cash surplus of about half a million dollars. This ready capital places the company in an excellent position for the carrying on of development work and the proving up of the ore bodies at greater depths. At the same time, the general scheme of development of the property is being carried out and with a return to satisfactory working conditions, it will be possible to operate at maximum capacity with a minimum of cost. When this time arrives, it is the opinion of well-informed mining men, Dome Mines will once again take its place among the leading gold producers of the Dominion.

Lake Shore Mine.

The official report of the manager of the Lake Shore Mines to the president and directors of the company, covering the operations at the property during the month of August, shows an increase in production of approximately \$5,000 over the month of July, and establishes a new high record of production for the company. According to the report, the mill ran 95.18 per cent. of the possible running time, the value of the output being estimated at \$44,000. Underground work consisted of crosscutting on the No. 1 vein at the 200-ft. level; also advancing the drift on the No. 2 vein. The raise on the No. 1 vein at the 300-ft. level was connected up with the No. 2 level, while the No. 2 vein was further opened up during the month. The ore hoisted for the period totalled 1,732 tons. Since the commencement of milling operations on March 8th last a steady increase in output has been recorded with the exception of the month of July, when delays were experienced which resulted in the mill running only 85 per cent. of the possible running time. During the first six months of operation 9,393 tons of ore have been treated, from which a recovery of \$236,049 has been made. The consistency of the milling operations and uniformity of ore value is evident by a perusal of the monthly tonnage and production of the company since the commencement of operations, which is as follows:

Month.	Tons.	Value.
March (8th to 31st)	1,050	\$23,606.56
April	1,520	42,090.00
May	1,750	43,000.00
June	1,761	43,353.36
July	1,580	39,000.00
August	1,732	44,000.00
Totals	9,393	\$236,049.00

During the month of August the mill heads averaged \$25.40 per ton. It is estimated the cost of production runs around \$8 to \$10 per ton, thus it will be seen a substantial profit is being made above the requirements of the company to disburse a regular quarterly dividend of 2½ per cent. At the same time, as a large amount of the ore being treated in the mill is coming from development work, the ore reserves of the mine are being added to at a rapid rate.

The Wright-Hargreaves Mill.

Mr. James Grant, who for a considerable time has been connected with the McIntyre-Porcupine mines, has been engaged to design and ultimately construct a mill for the Wright-Hargreaves property at Kirkland Lake. The new mill, which will be of 150 tons capacity, will be of the most modern type, similar to those in operation at the McIntyre and Lake Shore mines, and which have given excellent results at both these properties. The grinding will be done in ball and tube mills with the continuous counter-current decantation process of treatment.

The auriferous zone of the Kirkland Lake district passes directly through the Wright-Hargreaves, which embraces a stretch of nearly three-quarters of a mile of this important orebody. High-grade ore has been proven to a depth of 400 ft. on the property while on that of the Kirkland Lake Gold property at a depth of 700 ft. the grade and width of the orebody has been found to persist, with every indication of continuing to much deeper levels. From the foregoing it would appear the Wright-Hargreaves will eventually develop into a large mine.

Tough-Oakes.

About twenty-five men are now on the pay-roll of the Tough-Oakes Mines at Kirkland Lake, engaged in pumping, and cleaning up around the mill. It is expected this work will be completed about the first week of the coming month and if arrangements for the transfer of the money liberated by recent court proceedings in England is then available a large programme of underground development will be undertaken and the mine again placed in good shape. It is understood that after legal expenses are paid the Tough-Oakes treasury will be swelled to the extent of one hundred and fifty thousand dollars by the court's decision.

Ontario-Kirkland.

Camp and other buildings on the Ontario-Kirkland Mining Company's property have been completed. Electrical machinery throughout will be installed for the operation of the mine and already a four-drill compressor and electrical hoisting apparatus have been placed on order. Two veins have been uncovered on the property of good promise. One is said to be about two feet in width, containing average values of forty dollars; while a second vein, about four feet in width, gives average assays of twenty-five dollars per ton.

Teck-Hughes.

Efforts are being made by the management of the Teck-Hughes mine to re-open the property and it is hoped that an efficient organization will be secured to recommence operations the early part of next month. Owing to the fact that material for the refinery has also been placed on order it is expected both mining and milling will be proceeded with. Underground operations at this property have been carried to a depth of six hundred feet.

Kirkland-Porphyry.

Mr. Joseph Houston, formerly assistant manager of the Dome Mines, has accepted the position of manager at the Kirkland-Porphyry property. Development work at this property has reached a depth of 400 feet, with lateral work at each 100-foot level. Results of development to date have been highly encouraging. Where the vein was encountered at the 400-ft. level, gold values were shown over a width of twenty feet in places. The principals of the company are predicting that the mine will be on a producing basis before the conclusion of 1919.

Lightning River.

Mr. J. Morrison, formerly connected with the Lake Shore Mines at Kirkland Lake, has taken charge of operations at the Howie-Cochener Williams discovery claims in the Lightning River district. The plant recently installed is now in operation and the shaft has reached a depth of fifty feet. With the steam power available, it is expected more rapid progress will be made with the work from this time forward.

To Develop Water Power in Gauthier Township.

According to reports received at Cobalt, Montreal interests have organized a syndicate for the development

of a water power on the Beaver House River in Gauthier township. It is estimated about one thousand horsepower will be made available. The De La Huronia mine is located in this township and is owned by Montreal interests, which leads to the belief that the two propositions may have some connection.

Mr. Globe Goes to Sellwood.

Mr. A. R. Globe, formerly assistant general manager of the Hollinger Consolidated Mining Company at Porcupine, has taken charge of operations on an iron property near Sellwood in the Sudbury district. The town council of the town of Timmins presented Mr. Globe with a handsome club bag and address on his departure from the town.

A Mill for Burnside Property.

A new mill is to be erected at the Burnside property which is operated by the Aladdin-Cobalt Company at Kirkland Lake and will have a capacity of about thirty tons per day. The process will be straight amalgamation. The development of this property is being carried on with all possible speed. One shaft has reached a depth of 360 ft. and will be carried to the 425-ft. level. At this depth it is the intention of the management to run a crosscut to the south to the number six vein which is a distance of about 750 ft. A new shaft is now being commenced on this vein. When these two workings are connected, operations at the property will be greatly facilitated and better ventilation provided. It will then be possible to draw ore from the number six vein through the main shaft to the mill. Three other veins located a short distance south of the number six will be crosscut at a later date.

Activity in Boston Creek Area.

A number of important gold discoveries have been reported at widely separated points in the Boston Creek district during the past two weeks, and much general activity is apparent in the district, with many deals for properties being put through. During the week the O'Donald group of claims were optioned to Robert W. Norrington and associates, of Detroit. This group of claims comprises 200 acres, being claims Nos. 17951, 17953, 17954, in the township of Pacaud, and two claims, Nos. 5023 and 5024 in the township of Boston. The group lie directly between the R.A.P. Syndicate and Boston Creek Gold Mines on the west and the Patricia Mines on the east. The purchase price is said to run well up in six figures. A minimum of \$1,000 per month is to be spent in development work on the property and is to be commenced at once. Situated as these claims are, in the heart of the new gold camp, their development promises to be full of interest. The O'Donald group have long been known as the pioneer claims of the Boston field, having been purchased by J. C. O'Donald in 1913, since which time much development work has been done and a number of promising discoveries made.

During the past week a discovery of gold of considerable importance was made on the Campbell claims, situated in the northwest corner of the township of Catharine and including ground in the southwest corner of the township of McElroy.

Later in the week, word was received of still another discovery being made, this time on the Rogers-Barnett group of claims in Catharine township. A number of samples containing free gold were brought out recently and the discovery promises to be of more than ordinary importance. The dike in which the discovery was made is about forty feet in width and appears to be composed of altered basalt and diorite in which quartz veins carrying gold in coarse particles occur. This latest discovery

does not resemble in any way the ore being developed at the Miller-Independence property which lies about eight miles to the northwest, the occurrence of the gold as well as the rock formations of the district being greatly different, porphyry being absent at the point of the new discovery. The new find is on one of a group of six claims in lot 5, concession 2, Catherine. This latest discovery has caused a number of prospectors to flock to the district, with the result that practically all the surrounding territory has been staked. The area of the Boston Creek field is greatly enlarged and increased activity will likely prevail in the prospecting line from this time forward until the snow flies.

At the Miller-Independence property the shaft has reached the 200-ft. level and crosscutting is under way on the vein. The mill is being put in order for operation and when completed at least four faces on the new vein will be available from which to draw ore for milling. The results of the initial run on the ore from the new vein will be awaited with a good deal of interest.

The new railway station at Boston Creek has been completed and the camp has telegraphic and station service, the agent having been moved from Dane. Developments during the past summer have been of sufficient importance to make the change very necessary and much inconvenience is thus eliminated. Both passenger and freight traffic to and from the camp during the past summer has shown a very marked increase.

Will Operate Parragon-Hitchcock Property.

Arrangements have been completed for the commencement of operations on the Parragon-Hitchcock silver property at Wabun station on the T. & N. O. Elk Lake branch. These two properties figured in a consolidation several months ago.

May Develop Timagami Iron Deposit.

It is understood there is a possibility of a syndicate being formed for the operation of the Caldwell and Mulloch iron property, about one and a quarter miles north of Timagami station on the T. & N. O.

Skead Township.

Efforts are to be made this fall to secure assistance from the government in the building of a winter road from the Boston Creek camp west to the Skead township mining district. Plans are under consideration for co-operation between property owners in the district and the government in the construction of the proposed new roadway.

Matachewan.

The option held on the Ryan group of claims in the Fort Matachewan district by Robert Norrington and associates of Detroit, has been allowed to expire and the claims have reverted to their former owners. The equipment from these claims has been moved to the Boston Creek camp, where it will be used in the exploration of a number of claims under option to Detroit interests, among which are the Renaud-Cullen group.

Will Reorganize Bailey Company.

Word comes to hand this week that the Shareholders' Protective Committee of the Bailey Cobalt Mining Company have secured judgment against the directors of the company, and negotiations are now in progress for a restoration of the business of the corporation on a new basis. It is expected the company will be properly organized within the next sixty days and an accounting will then be taken of the outstanding shares. The judgment of the court is that the property belongs to the shareholders and that the total liabilities of the company will be \$15,000 inclusive of the legal expenses. The property has been idle for the past two or three years.

JAMES DOUGLAS.*

By Rossiter W. Raymond.

James Douglas was born at Quebec, Canada, November 4, 1837. His father, James Douglas, was a distinguished physician and surgeon, known in many lands, especially in the Orient, and famous in his own country for his philanthropy as well as his skill, having established and directed for many years the first retreat for the insane in the Dominion of Canada.

One of the latest literary labors of his son was the editing and publishing of his father's journal and reminiscences—a fascinating volume, the review of which, though a tempting task, I must here forgo. Nearly fifty years ago, I had the great pleasure of spending an hour with the elder Douglas, who guided me through his collection of Egyptian and Asiatic treasures. I might almost say souvenirs; so many of them were connected with personal experiences and exalted personages. The veteran's memory had already begun to fail with age, but his vivacity and imagination glowed all the more brightly; and his reminiscences of travel and adventure were embroidered with Oriental magnificence. I felt, after that hour, as if I had visited a stately, half-ruined edifice, overgrown with vines and flowers.

The father's genius, adventurous spirit and generous philanthropy descended to his versatile, yet practical son. Like other men of such temperament, James Douglas tried many things before circumstances beyond his own control forced him into the line of his principal lifework. At the age of 18, he was sent to the University of Edinburgh, where he studied for two years. Returning to Canada, he entered Queen's University, at Kingston, Ontario, where he was graduated as Bachelor of Arts in 1858. Subsequently he studied medicine at Laval University, Quebec, and it was doubtless during this period that he assisted his father in the management of the Quebec lunatic asylum; and also traveled extensively with him in Europe and the East. In connection with his study of medicine at Laval University he became interested in chemistry, which he afterward taught for several years at Morrin College, Quebec. No doubt his excursion in this direction was initiated by his acquaintance with a man who was destined to have a decisive influence upon his future career, namely, Thomas Sterry Hunt, at that time about 33 years old, who was lecturing on chemistry in the French language at Laval. Hunt's prodigious intellectual activity, keen insight into the facts and laws of nature, and fierce enthusiasm in the pursuit of scientific truth (qualities evident enough in later years, but doubtless supereminent in his youthful prime) must have affected profoundly a mind like that of Douglas. The two became close friends and in after years business partners. Yet meanwhile their paths were widely sundered. Hunt continued his brilliant career as chemist and geologist, on the Canada Geological Survey, in the faculty of McGill University, on the juries of successive international expositions, as the recipient of sundry honorary degrees and decorations, as prolific author of notable scientific papers, and finally as Professor of Geology in the Massachusetts Institute of Technology, and one of the most active promoters and officers of the American Institute of Mining Engineers. Douglas, meanwhile, returned to Edinburgh, to continue the study of medicine—choosing, however, this time the more scientific branch of surgery—and pursuing as an avocation at the same time a course on theology, which he carried so far as to receive a license to preach. It is permissible to con-

*From the September bulletin of the American Institute of Mining Engineers.

jecture that he prophetically foresaw the type of spiritual leader who ministers to both soul and body—a type more fully developed nowadays in the medical missionary, and furnishing for Douglas a welcome compromise, or rather combination, of activities, satisfying at once his love of science and his love of men. But his professional plans were cut short by the pecuniary embarrassments of his father, who had made unfortunate investments in mining schemes; to assist him, the younger Douglas returned to Canada, about 1871.

The investments referred to were in the Harvey Hill copper mines in Quebec, the 2 per cent. copper ores of which could not be economically treated at that time by any known process. Douglas was doubtless familiar with the researches of Sterry Hunt on the reactions between cupric oxide, sulphur dioxide, etc., and had recourse to his old friend in this emergency. Together they worked out the famous Hunt and Douglas process, the original form of which was described by Hunt as follows:

"The essential principle of this new process . . . is the dissolving of the oxides of copper by a hot solution of protochloride of iron and common salt. In the action which takes place, the protochloride of iron is converted into peroxide, while the oxides of copper are changed to protochloride and dichloride, the latter of which, though insoluble in water, is readily soluble in a hot, strong brine. From the solution thus obtained, metallic iron throws down the copper in a metallic state, regenerating the protochloride of iron, which is then ready for the treatment of a fresh portion of oxidized copper ore."

The obvious ingenuity and beauty of this process made it very attractive to metallurgists; and for a time it was believed that the treatment of 2 per cent. copper ores had been made economically practicable in this way. It would be easy but tedious to enumerate here the many practical and commercial difficulties which have proved, so far, insurmountable by such methods. In 1893, Douglas himself wrote:

"There has been, however, but little patronage extended to wet copper-methods, mainly because we do not possess, within accessible reach of the chemical centres, any large bodies of cupriferous pyrites, whose residues, after the extraction of sulphur and copper, would possess value as an iron-ore. The treatment of the low-grade oxidized ores of the Southwest is awaiting realization. In the past, various attempts have been made to employ old and new wet methods; but none has proved commercially successful, nor has any survived until to-day."

In 1875, Mr. Douglas went to the United States as Superintendent of the Chemical Copper Co., of Phoenixville, Pa., which treated copper ores and pyritic cinders, and also melted and refined base metal. A variety of the Hunt and Douglas process was employed for extraction. It was a small plant, and ill-supplied with capital. I remember examining it while Douglas was in charge, and admiring the courage with which he struggled against technical difficulties, and the ingenuity with which he devised substitutes for expensive apparatus. It was an up-hill business, and after some years of strenuous endeavor the plant was destroyed by fire. But the discipline of the long contest had made a strong man of Douglas, while his business relations had brought him into contact with many who could not fail to be impressed by his ability and integrity. For some years after the failure of the Phoenixville enterprise, he was without fixed employment, though he did some important consulting work, visiting

Montana, Colorado and other mining districts. Concerning the stroke of well earned "good luck" which placed him on the straight road to fame and fortune, I cannot do better than quote the story as told by Dr. Ledoux:

"An accident brought him into contact with the old metal house of Phelps, Dodge & Co. When the Copper Queen mine was opened by Martin and Reilly, the first carloads of copper bars were sent to Phoenixville to be refined by Dr. Douglas's works. He had been introduced to Mr. William E. Dodge and had been retained to report on the Detroit Copper Company's mines in Arizona. This firm was conservative in the extreme and, while very large sellers of metals, had but recently entered into the mining field, considering mining somewhat of a gambling venture. Urged by an acquaintance, they had taken an option on the former Copper Queen—the original of the name—in Arizona, and engaged Dr. Douglas to examine it. They agreed to pay his expenses and to furnish him with a certain sum of money with which to test the property, promising that if they took it over on his recommendation, they would place the management in his hands and give him an interest.

"The world knows to what great heights Phelps, Dodge & Co. have attained in the mining business. Dr. Douglas, upon the incorporation of the firm, became its President. The writer feels sure that those who have succeeded to the control of this corporation after the deaths of Messrs. William E. Dodge, Senior and Junior, and of Mr. D. Willis James, will not resent the statement that, in the writer's opinion, Dr. Douglas supplied the imagination necessary in all great enterprises, while they supplied the money and equally important careful business management.

"The product of the smelter at Bisbee was hauled several miles to the railroad by mules. He put in the first traction engines employed in the southwest. This method becoming too slow, he built the railroad from Bisbee to Fairbanks, the junction with the Southern Pacific. When the product of the Copper Queen became too great to handle economically at Bisbee, it was his idea to establish at Douglas the beginning of the great smelting plant which to-day is second to none—if not in capacity, at least in well thought-out installation and correlation of its parts; in efficiency and economy in management.

"Looking further ahead than the life of the Copper Queen, it was Dr. Douglas who suggested the taking over of adjoining properties in the Bisbee camp, and the agreement to disregard the law of the apex and questions of extra-lateral right, so there has been no litigation at Bisbee from these fertile sources of trouble in most mining camps.

"It was Dr. Douglas, again, when fuel became expensive and irregular in delivery, who suggested the organizing of a coal company to supply their own needs and to enable them to sell coal and coke to others without paying tribute in high freights to the railroad. Again, it was his suggestion that their railroad should be extended to El Paso, and that branch lines should be built into Mexico, where, on his initiative, Phelps, Dodge & Co. had already secured important producing mines, destined to add a very considerable tonnage to their output of copper."

In 1875, the year when Douglas came to Phoenixville, he was elected a member of the American Institute of Mining Engineers, and in June, 1876, he entertained at his works a visiting party of its members. Already, thus early in his career, he manifested the

quality which was afterward so characteristic of him—a great willingness to communicate, as well as to receive, the results of discovery and practice. The Institute, founded to promote this open interchange of professional knowledge, appealed peculiarly to his mind, which disdained to harbor secrets. Through the five years in which he bravely fought at Phoenixville a losing fight, he remained in the Institute; but when that enterprise had failed, and he was obliged to begin again somewhere else, he resigned his membership, the annual expense of which he could not conscientiously afford. But after professional recognition and business success had returned to him, he secured reinstatement in that relationship and thenceforth unto the end was in every way a loyal, potent and munificent supporter of the Institute. I mention this episode of his temporary retirement, because it was influential in the history of the Institute itself. For years after Dr. Douglas had become a leader in its management (he was Vice-president in 1897-8, President 1899-1900, Director from 1905 to 1913, Honorary Member from 1906, and Vice-president of the Board of Directors from 1906 to 1911) he was a strong opponent of the increase of annual dues. Even after the acceptance by the Institute of Mr. Carnegie's gift (involving a heavy land-debt), he was not willing to meet additional expenses in that way. "I remember," he used to say, "when even ten dollars a year was too great a burden for me; and I will not vote to lay a heavier load upon young American engineers."

At the time when Phelps, Dodge & Co. became a corporation, the members of the firm set aside \$10,000 as a gift to Dr. Douglas, in recognition of his past services. But under his earnest persuasion, they gave the money to the Institute land-fund instead, in addition to their earlier subscription of some thousands of dollars. He was himself also at that time already a large subscriber.

This does not exhaust the list of his benefactions to the Institute. After the land-fund had been completed, he gave \$100,000 to the Library; and it is reported in the newspapers that he left to the same object \$100,000 more in his will.

Dr. Douglas in 1860 married Miss Naomi Douglas, daughter of Captain Walter Douglas, of Quebec, who survives him, together with two sons and two daughters: Major James F. Douglas, developer of the United Verde Extension Mine, who is now serving in France; Walter Douglas, who succeeded his father as President of the Phelps-Dodge Corporation; Mrs. Edith M. Douglas, wife of Archibald Douglas, a New York lawyer of extensive mining interests, and Miss Elizabeth Douglas.

Good-by for a while, James Douglas!—unwearied worker, courageous leader, wise counsellor, glad giver, faithful lover and friend—"Douglas, Douglas, tender and true!"

Magistrate Atkinson has handed down a decision in the case recently heard in the Cobalt courts, involving the alleged infringement of the Ontario Land Surveyors' Act by a mining engineer. The decision is against the land surveyors and the mining engineer is acquitted. The decision promises to be far-reaching in effect. The trouble began some three weeks ago when M. P. MacDonald, a mining engineer, was summoned into the Cobalt police court charged with infraction of the Ontario Land Surveyors' Act.

MARKETS

STANDARD MINING EXCHANGE.

(Messrs. J. P. Bickell & Co., report the following quotations on the Standard Stock & Mining Exchange, Sept. 27, 1918.)

Gold.		
	Ask.	Bid.
Apex .....	.03	.02½
Boston Creek Mines .....	.30	.25
Davidson .....	.32	..
Dome Cons. Mines .....	.03	...
Dome Extension .....	.16	14¾
Dome Lake .....	.15	..
Dome Mines	10.25	10.00
Eldorado .....	.02	.00½
Elliott-Kirkland .....	.36	..
Hattie Gold Mines .....	.62	.61
Hollinger Cons.	4.95	4.90
Keora .....	.06	.05
Kirkland Lake .....	..	.38
Lake Shore M., Ltd. ....	.74½	.72
McIntyre	1.49	1.48
Moneta .....	.08	.06½
Newray Mines, Ltd. ....	.12½	.11½
Porc. Crown .....	.15	.14½
Porc. Imperial .....	.01½	.01
Porc. Tisdale .....	.01½	.01½
Vipond .....	.14	.11
Preston East Dome .....	.03	.02½
Schumacher .....	.20	.19
Teck-Hughes .....	..	.23
Porc. V. N. T. Gold M. ....	..	.09
Thompson-Krist .....	.04¾	.04½
West Dome .....	.09¾	.09
Wasapika Gold M., L. ....	.30	..

Miscellaneous.		
Vacuum G. ....	.08¾	.07½
Rockwood Oil & Gas .....	.32	.30½

Silver.		
	Ask.	Bid.
Adanac Silver M., Ltd. ....	.07	.06½
Bailey .....	.04¾	.03¾
Beaver Consolidated .....	.30	.29
Chambers-Ferland .....	.11	.10¾
Coniagas .....	..	2.60
Crown Reserve .....	.22	.19
Foster .....	.02½	.01½
Gifford .....	.02¾	.02½
Great Northern .....	.03¾	.08
Hargraves .....	.03	.02¾
Hudson Bay	18.00	16.00
Kerr Lake	6.15	5.75
La Rose .....	.53½	.53
Lorrain Con. M. Ltd. ....	.02	...
McKin.-Dar.-Sav. ....	.41	.40
Mining Corp. of Can.	2.50	2.30
Nipissing	9.00	8.55
Ophir .....	.06¾	.06¾
Peterson Lake .....	.09	.08
Right of Way .....	.04	3½
Seneca-Superior .....	.01½	...
Silver Leaf .....	.00¾	.00½
Temiskaming .....	.30½	.30
Trethewey .....	.25	.23½
Wettlaufer .....	.07½	.04½
York Ont. ....	.01	.00¾

CHROMITE IN THE UNITED STATES

Significant articles have appeared recently in the mining journals concerning a higher and more equitable price to the man who mines and markets the chrome ore used in making ferrochrome now selling at \$400 a ton. The Geological Survey has suggested an increased and more stable price for chromite as a most effective means of increasing domestic production by encouraging and arousing the small producer to do his utmost.

The price of 40 per cent chromite at the beginning of 1917 was \$15 a ton, that is, 37½ cents a unit of chromic oxide, but at the end of the year the price had been raised to 70 cents a unit, or \$28 a ton. The actual price reported to the U. S. Geological Survey ranged from \$10 to \$50 a ton and the average price of the ore sold during the year by producers was a little more than \$24 a ton. Early in 1918 the price for 40 per cent ore reached 85 cents a unit (\$34 a ton). The impending crisis resulting from lack of ships to import the ore needed for war purposes has impelled the principal consumer, the Electro-Metallurgical Co., of New York, to advance prices greatly in the hope of increasing domestic production. The statement of the company was published March 17, 1918, in the form of an appeal, as follows:

To Pacific coast prospectors and miners: The California Chrome Co., which has operated in California and Oregon for the last two years, will contract for the balance of this year for chrome ore at a minimum price of \$1.25 per unit for 38 per cent chromic oxide and upward. Premiums will be paid for early delivery. Advances will be made on good prospects for development work. Settlements in full will be made on independent chemists' sampling and analysis on receipt of bills of lading and weight certificate.

All low-grade chrome ores cannot be concentrated to advantage. This is especially true of low-grade ores in which the chromium has been replaced by aluminum and iron. Chrome ore rich in magnetite may under some conditions be successfully handled by a magnetic separator. Concentrating plants have been a feature of the chrome industry in Canada ever since 1898.

The measure of normal annual consumption of chromite for all the various uses before the war may best be expressed by the sum of domestic production and imports in 1913, about 65,000 long tons. On account of the greatly augmented demands of war conditions it has been estimated by the committee on mineral imports and exports of the Shipping and War Trade

boards that the needs of the United States in 1918 will be equivalent to about 130,000 long tons of 50 per cent ore, of which 67,500 tons will be needed for ferrochrome, 40,000 tons for making bichromates and other chemicals for tanning, etc., and 22,500 tons for refractory purposes.

MOND NICKEL COMPANY.

At the annual meeting of the Mond Nickel Company, Limited, held in London recently, particulars of which are contained in British exchanges to hand, it was shown that owing to the scarcity of labor and material the company had not been able to complete the extension intended. The Chairman, Mr. Robert Mond, said that satisfactory progress was being made in the erection of the fifth unit, and that some steps were being taken towards the erection of a sixth. He said that the management in Canada, not having suffered to the same extent as the parent company in Great Britain, had made much better progress in construction work. In spite of the shortage of labor, the company had not only substantially increased its output of Bessemer matte, but had also been able to put itself in a position to supply for the intended increase of the refining plant. Their supplies of matte in Canada for the refining work had, he said, been brought across the Atlantic without interruption, while the Government authorities had provided the company with the necessary permission to secure the requisite material to maintain the plant in full working order.—The Globe.

RICH ORE FOUND AT LANARK MINE

A rich strike is reported at the Lanark mine, Illecillewaet, B.C., one of the oldest mines of British Columbia. One ore shoot has been uncovered for 350 ft., and the ends are not reached. There are fourteen inches of clear lead and copper ore and four to five feet of concentrating ore running 20 to 25 per cent. lead. The clear ore runs from 50 to 70 per cent. lead and from 40 to 100 ounces silver to the ton, and has been assayed to 248 ounces of silver. The company is running a cut into the shoot 90 ft. deep and \$40,000 worth of machinery is being installed.

Permission has been granted by Mr. George Wilkinson, Chief Inspector of Mines for British Columbia, for the opening of the Jingle Pot Coal Mine, Vancouver-Nanaimo Coal Mining Co., Ltd., which was ordered sealed ten months ago owing to the discovery of fire. In the interim, the mine has been flooded.

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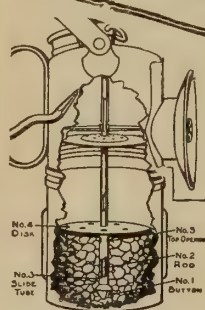


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One of the greatest factors in development of mineral areas is the provision of transportation facilities. Railways and the mining industry have together played a very important part in the development of several parts of Canada.

The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

The Canadian Northern Railway in Manitoba gives access to the Pas Mineral Area. In Alberta the Canadian Northern is serving important coal fields.

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Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

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Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to \$11,486,167.45 for gold mining companies, and \$70,821,829.34 for silver mining companies, or a total of \$82,307,996.79.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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DEPARTMENT OF MINES

HON. MARTIN BURRELL, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke.

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

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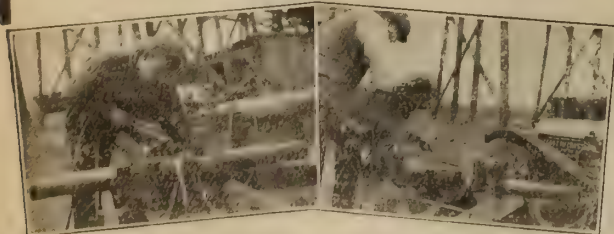
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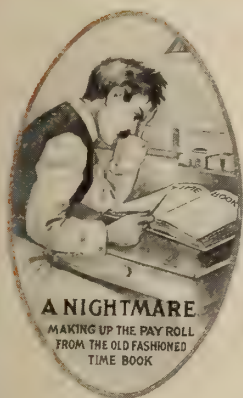
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VOL. XXXIX

TORONTO

No. 20



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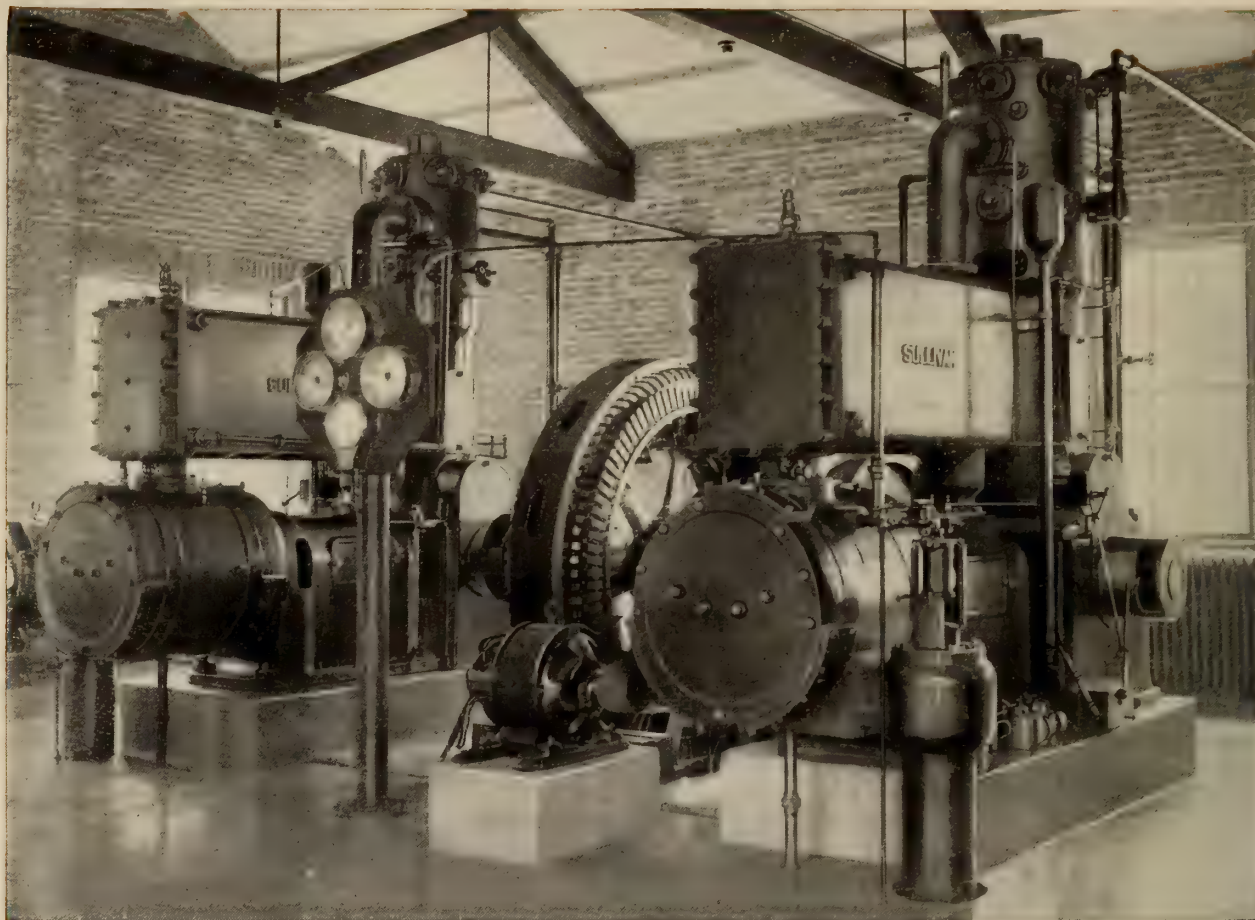
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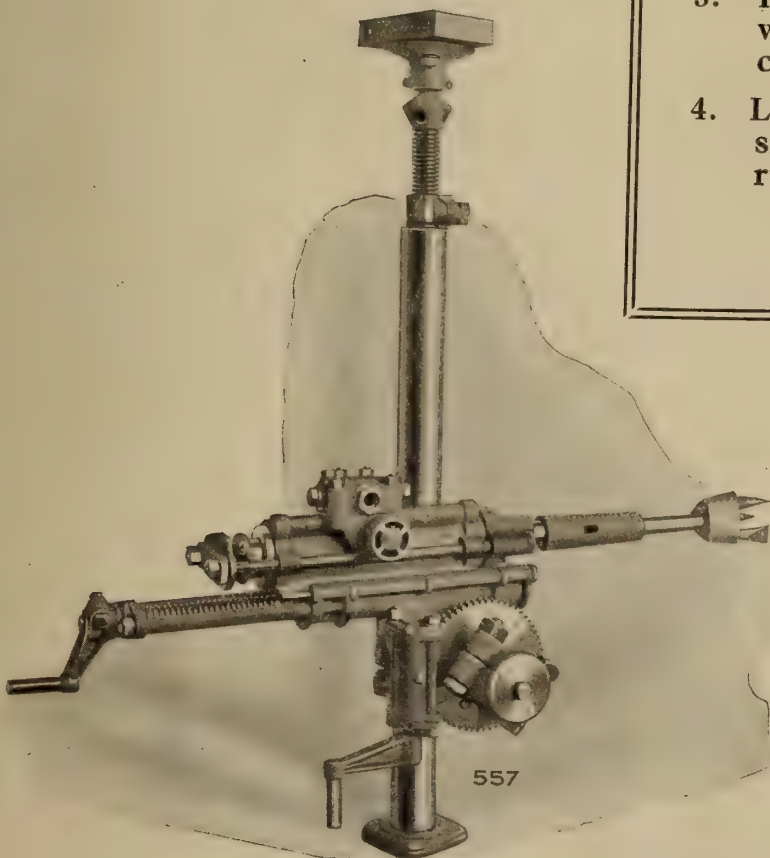


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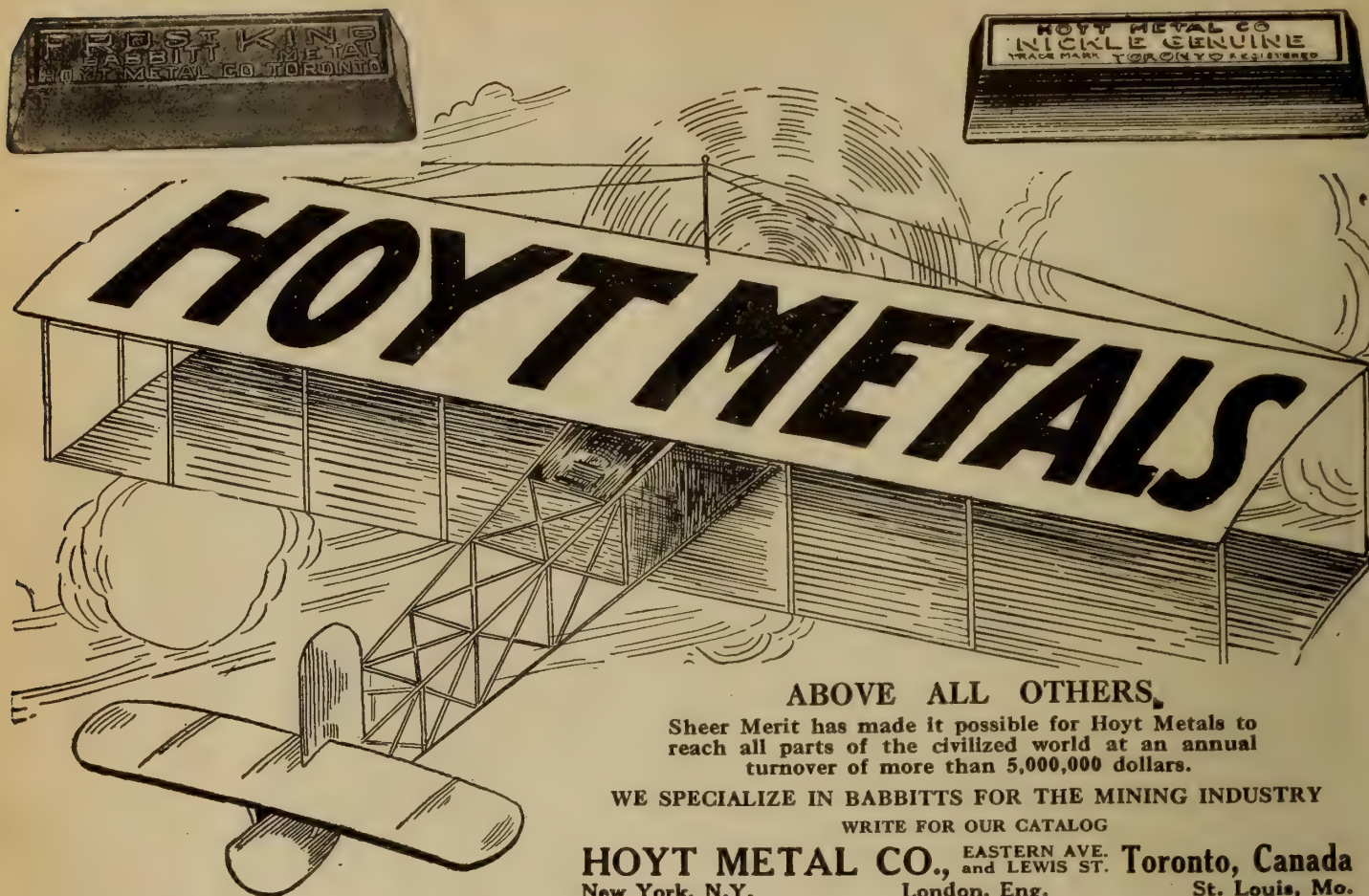
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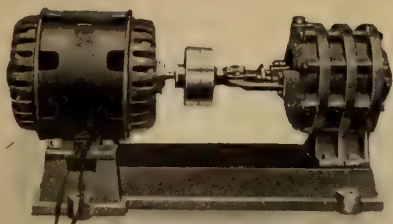


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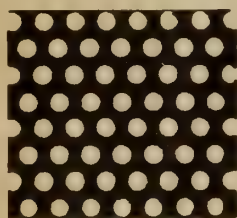
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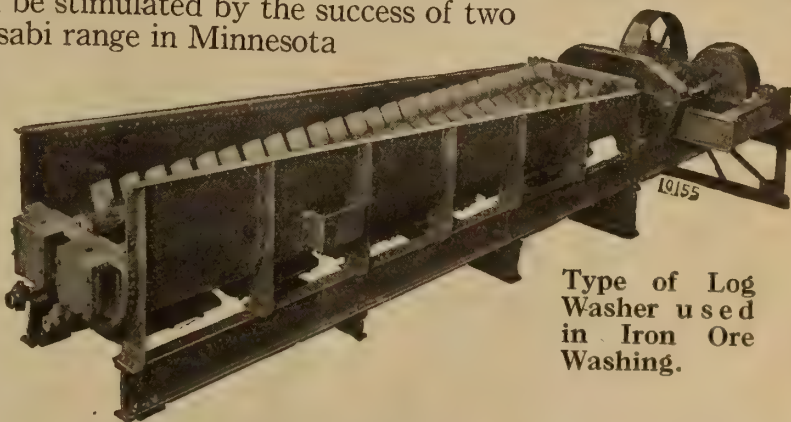
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There are large bodies of iron ore in Canada too low in iron content to be smelted direct in the blast furnace at a profit, hitherto, but in view of the great demand for steel they are likely to assume economic importance.

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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

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The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

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MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or, by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

All applications should be made direct to

MINERALS SEPARATION NORTH AMERICAN CORPORATION

Head Office:
61 Broadway,
New York, N.Y.

Engineering Office:
Merchants' Exchange Building
San Francisco, California

or through

Messrs. Ridout & Maybee, Patent Solicitors, 59 Yonge St.
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Aggregate Value of \$595,571,107

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392.

Production During last ten years, \$296,044,925

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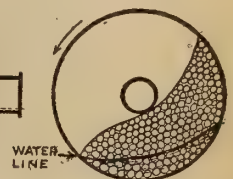
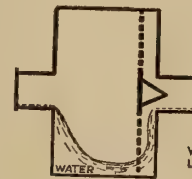


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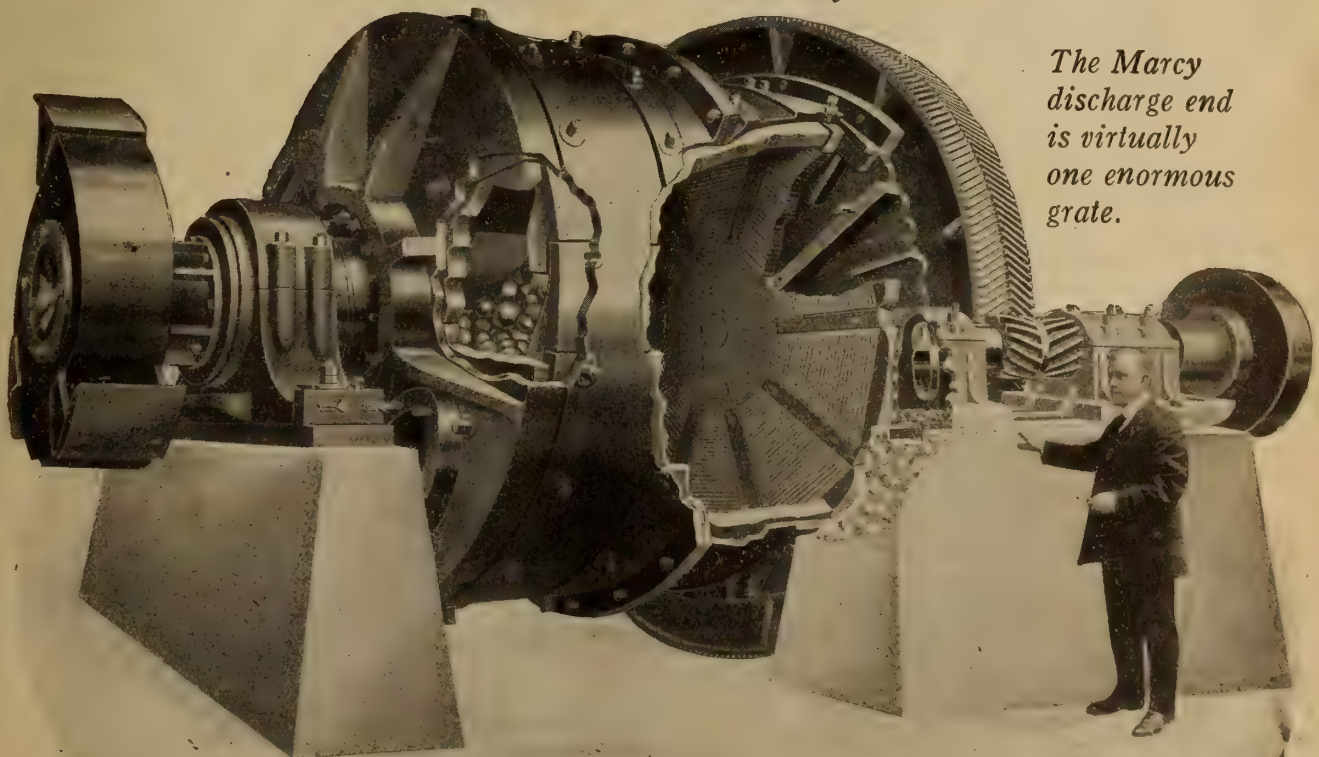
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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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WANT ANALYTICAL LABORATORY IN CENTRAL B.C.

Mining men of British Columbia want the Dominion Government to establish an analytical laboratory at some central mining point in the Province, and an agitation to this end has been in progress for some time. In the hope that his action may induce the Federal authorities to take this step. Mr. M. S. Davys, of Kaslo, B.C., has offered through the Kaslo (B.C.) Board of Trade to furnish a building for such a mill and it is understood that the municipal authorities would be agreeable to furnishing the necessary electrical power. It is admitted that a laboratory of the kind would be of material service to the operators of the southern interior of the Province.

Mr. Wm. Thomlinson, ore sampler for the Canadian Munitions Board, recently visited Franklin camp and forwarded ore samples to the Dominion Assay Office, Vancouver. While the returns did not demonstrate the presence of platinum in commercial quantities they were sufficiently satisfactory to warrant a closer survey of the entire district.

The Dominion Government has established a platinum camp on Slate Creek, a tributary of the Tulameen near Princeton, B.C. It is in charge of Mr. George E. MacKenzie, of the munitions commission.

The refusal of the miners of the Crow's Nest District to go to work pending an inquiry is sure to react to the disadvantage of coal miners at Fernie and elsewhere. Those who are responsible for increasing the shortage of coal at this time, have little cause to wonder that they fail to secure the sympathy of the public. Miners and operators of coal mines have alike a duty to perform at this time and no differences between them are so great that they should be allowed to retard the carrying on of war work.

It is reasonable to expect that wages should be increased as cost of living and danger in mines increases. It is reasonable also to expect that every effort will be made by both miners and operators to settle their differences without retarding production. It must be admitted that it is not always easy to settle labor disputes, and that one or the other side is often disposed to be unreasonable. It must be admitted by the miners that a serious endeavor is being made to investigate their grievances, and their refusal to work on Mr. Armstrong's terms will convince the public that they are shirking their duty, regardless of consequences. We hope that in the interests of miners generally the miners of Fernie District will take action that will prove that they have been misrepresented. We would like to believe that they have, for otherwise their conduct is a disgrace to the industry.

The great successes of the Allies during the past three months have brought victory much nearer. Few of us had reason to expect that success would come so soon. It was confidently expected that victorious advances would come in the spring of 1919; but already the change has come over Europe.

Great activity in the mining and metallurgical industries must follow the war. While a great endeavor has been made to keep up production of minerals and metals during the war, there has been greater consumption than production. The period of reconstruction will make great demands on our basic materials. During the war the shortage of men, machinery and supplies and their high cost has imposed serious handicaps on the mines, they have done well under these handicaps and it is certain that they will do better under normal conditions.

Very successful results are being obtained at Quyon in treating molybdenite by the flotation process. At Cobalt the flotation process is a great boon to operators, and is making possible the recovery of silver from low grade material at a time when the price is good. The mining industry in Canada, as elsewhere, owes more to those who invented and developed the flotation process than is generally acknowledged.

The Reports of the Resident Engineers of B. C.

By E. Jacobs.

The Annual Report of the Minister of Mines of British Columbia for the calendar year 1917, issued recently, includes the following official comment:

"During the session of 1917 the Hon. the Minister of Mines brought in the 'Mineral Survey and Development Act,' which was passed on May 19, 1917, and under the provisions of which the Province was divided into six Mineral Districts, to each of which there was appointed a Resident Engineer with headquarters at a centrally located point in such district.

"In the district to which he was appointed the Resident Engineer is expected to devote his whole time to the performance of the duties of his office, and to carry on continuously a mineral survey of his district, keeping records of the same, and of the mining and mineral developments taking place, and at the same time to assist prospectors and others with such advice as may be necessary and may come within the scope of a mining engineer's work.

"Aside from special reports which may be called for by the Minister, the Resident Engineers are expected annually to make a comprehensive report covering all matters relating to mining, mine development, and prospecting that have occurred within the year in their respective districts.

"These annual reports of the Resident Engineers are given later in this general report, and form the basis of the information given in respect to the mineral industry and its development within the Province.

"As the Resident Engineers did not take office until the season of 1917 was well advanced, and as the work was new to many of them, their reports are not as complete or comprehensive as they probably will be next year."

The value of mineral production in 1917, and the total value for three years 1915-1917 as shown in the last Annual Report, were as under:

VALUE OF PRODUCTION, 1917

District	Metallic	Non-metallic	Total
No. 1—Northwestern.....	\$8,405,696	79,742	\$8,485,438
No. 2—Northeastern.....	525,641	4,256	529,897
No. 3—Central.....	333,822	540,791	874,613
No. 4—Southern.....	4,191,960	62,005	4,253,965
No. 5—Eastern.....	8,970,491	2,058,836	11,029,327
No. 6—Western.....	4,856,864	6,980,288	11,837,152
Totals.....	\$27,284,474	\$9,725,918	\$37,010,392

TOTAL VALUE OF PRODUCTION FOR THREE YEARS, 1915-1917.

District	Metallic	Non-metallic	Total
No. 1—Northwestern.....	\$19,968,211	\$149,164	\$20,117,375
No. 2—Northeastern.....	2,178,300	15,256	2,193,556
No. 3—Central.....	737,084	1,326,252	2,063,336
No. 4—Southern.....	15,681,912	188,679	15,870,591
No. 5—Eastern.....	30,195,649	8,709,138	38,904,787
No. 6—Western.....	11,348,981	18,249,736	29,598,717
Totals.....	\$80,110,137	\$28,638,225	\$108,748,362

The various mining divisions included in the several Mineral Survey Districts are:

In No. 1—Northwestern District—Atlin, Stikine, Liard, Skeena, Portland Canal, Bella Coola, and Queen Charlotte.

In No. 2—Northeastern District—Omineca, Peace River, Cariboo, and Quesnel.

In No. 3—Central District—Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale.

In No. 4—Southern District—Similkameen, Osoyoos, Greenwood, and Grand Forks.

In No. 5—Eastern District—Golden, Windermere, Fort Steele, Ainsworth, Slocan, Slocan City, Trout Lake, Nelson, Arrow Lake, Revelstoke, Lardeau, and Trail Creek (Rossland).

In No. 6—Western District—Nanaimo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver, and New Westminster.

The Northwestern District.

The report of the Resident Engineer for the Northwestern District may be fairly adjudged the best-balanced and generally the most commendable of the lot. It is an excellent report, giving prominence to the most important things, wasting little or no space on unimportant ones, and treating briefly, but sufficiently, with regions and properties of promise. Where there was no opportunity to visit an important part of the district, as in the case of the Atlin gold field, a summary of results was obtained from the district Gold Commissioner, and included in the report. Bibliography and lengthy disquisitions on geology are left out, and instead useful general information is given, so that prospectors and miners are not confused by much technical detail. Most space is given to the important copper mining and smelting enterprise established in the district by the Granby Consolidated Co., the incorporation in the report of a comprehensive description—fully authentic since written by one of the company's prominent officials—being timely and of particular value to those desirous of knowing what progress has been and is being made by that company in that part of the province. Further, the mention of the company's exploration work and prospecting activities on Klekane inlet, Gibson island, Ecstall river, Portland canal, Bear river, and elsewhere, in its search for new mines, indicates the extending enterprise of this company.

The account given of the gold-mining property of the Belmont-Surf Inlet Mines, on Princess Royal island, is also of much interest. The mine, concentrator, hydro-electric power system, and plant and equipment generally are described, and the importance of this recent addition to the gold producing mines of the Provinces made clear.

The considerably improved outlook for the Portland Canal mining division is shown in the valuable information given relating to the Georgia River and the Salmon-Bear River mines; attention is directed to promising magnetite properties on Seymour inlet; information accounting for the delay in shipment of ore from Alice arm of Observatory inlet, from which a considerable production has been expected, is supplied; and summaries of the situation in various other parts of the district are also included in the report.

The illustrations in the general report that have relation to this district all have a practical bearing on matters dealt with in the text. The sketch map of the Salmon River district in Portland Canal division, is informative and useful, while the plans and views of the Granby Consolidated Co.'s properties—some of which should have appeared in the 1916 report, since many photographs were available early in that year—serve to impress those who have not visited Anyox or the Hidden Creek mine with the extent of the company's operations and the substantial character of its mining and smelting undertakings.

It is a pity that errors in figures occur. On one page, it is stated, in the Engineer's report that "the district in 1917 produced 822,819 tons, of which 784,000 tons was mined and smelted by the Granby Company, of Anyox,

which tonnage includes the low-grade quartz mined for use as flux." On another page the statement is made that the tonnage of ore mined and smelted was about 784,000 tons, averaging 2.12 per cent. copper, the gold and silver amounting to approximately \$240,000. The tonnage of low-grade quartz ore mined was about 37,000 tons, or a total of 812,000 tons." Again, it is stated on one page that the Belmont-Surf Inlet Mines Company shipped to the Tacoma smelter 722 tons of table and flotation products, and on another page after stating that production is 25 to 30 tons of concentrates in 24 hours it is added that "the company will have shipped in 1917 about 1,700 tons, and expects to have a steady output of between 800 and 900 tons a month." In the general report it is printed that the district output was 821,819 tons and that the Granby Company treated "approximately 784,000 tons of ore, and in addition 38,000 tons of quartz flux and 53,000 tons of limestone flux."

Aside from these minor blemishes, though, the report is a most creditable one, and appears to measure more up to the stated requirements of the "Mineral Survey and Development Act" than any of the others also included in the general report.

Northeastern District.

The production of ore, in the Northeastern District, as shown in the official records, during the last three years was as follows: In 1915, 17,545 tons; in 1916, 17,752 tons; in 1917, 4,159 tons. The recorded value of the mineral production was: For 1915, \$885,502; for 1916, \$778,157; for 1917, \$529,897; total for three years, \$2,193,556. Of this total, \$2,178,300 was for metalliferous minerals. The decrease in value for 1917 was 32 per cent. as compared with 1916 and 40 per cent. with 1915.

In the report of the Resident Engineer it is stated that: "The mineral production of the Northeastern District for 1917 was a little less than in the year 1916. The principal reason for the decrease in value of output was, first, a smaller production of placer gold in all parts of the district, and, secondly, to the fact that the two principal lode mines—the Rocher Deboile and Silver Standard—were only shipping during one-half of the year. Both these mines are in shape, however, to make a good production in 1918. There were, however, a greater number of small shippers in 1917 than in any previous year, which is an encouraging sign for the future." The individual shippers of more than 100 tons of ore were as follows: Rocher Deboile, 2,889 tons of copper ore; Silver Standard, 671 tons of silver-lead-zinc ore; Santa Maria, 239 tons of copper-silver ore, and the M. & K., 123 tons of silver-lead-copper ore. Eight other properties together shipped 237 tons of ore containing silver, copper, and lead. The quantities and value of the minerals were: From Omineca division: Placer gold, 600 oz., \$12,000; lode gold, 931 oz., \$19,244; silver, 82,311 oz., \$63,668; lead, 271,885 lbs., \$21,506; copper, 852,373 lbs., \$231,675; zinc, 364,097 lbs., \$27,548, and miscellaneous materials, \$1,500; total, \$377,141. From Cariboo division: Placer gold, 6,750 oz., \$135,000, and miscellaneous materials, \$2,756; total, \$137,756. From Quesnel division: Placer gold, 750 oz., \$15,000. Total value for the whole of the Northeastern District, \$529,897. A little more than 75 per cent. of the lode-mineral production of the district came from the neighborhood of Hazelton, and the remainder from the Skeena River and Telkwa sub-districts.

In fairness to the Resident Engineer it should be pointed out that in having to report on a district containing nearly 100,000 square miles of territory in which last year there were only four mines that shipped more than 100 tons of ore each, and only one with an output of more than 1,000 tons, and in which there has been a steadily diminishing production of placer gold in the last two years, his field for comment of value is not of the best. Under

the circumstances, perhaps it would have been better for him to have placed more emphasis on the few points of general interest and condensed his report accordingly.

The list of the more important published official reports on the geology and mineralogy of the district is of value. Brief particulars of several miscellaneous minerals—scheelite in Cariboo division, and molybdenite and peridots in Quesnel division—are noteworthy. Information concerning many more or less developed mining properties, few of which, though, have yet reached the productive stage, will be handy for reference and so will be welcomed by many interested in the district. On the whole, however, the mining industry of the newer parts of the district has not yet made sufficient progress for this report to possess nearly so much value to the general public as one on a rapidly progressive mining district would do.

The Central District.

As regards mineral production, this is the least important district in the province, for the total value of its output in 1917 was only \$874,613, or less than two and one-half per cent. of the total for the province for the year, and less than two per cent. of that of the three-year period, 1915-1917. This would not seem, though, to be a sufficient reason for the quite inadequate report of the Resident Engineer, the text of which fills not quite eleven pages, and makes little or no reference to the more important mining operations carried on the district, nor to minerals that might well have had attention. This is to be regretted; for the mineral potentialities of the district are consequently not even fairly presented, when under the handicap of such limited production it might have been expected that the most would have been made of the opportunity to prepare a reasonably fair and full account of them.

Having in view the official statement that "Resident Engineers are expected annually to make a comprehensive report covering all matters relating to mining, mine development, and prospecting that have occurred within the year in their respective districts," it is evident that this requirement was in some comparatively important respects lost sight of by the local official.

The Southern District.

The Resident Engineer of the Southern District may be said to have erred just as much in the matter of brevity as did his co-officials of the Northeastern and Western Districts in the opposite direction. The disproportion already pointed out is markedly noticeable when it is taken into account that only ten pages of text are devoted to the Southern District with a metalliferous production of a total value of \$15,681,912 for three years, 1915-1917, which was nearly twenty per cent. of the grand total for the province for that period, while the Northeastern District has five times as much space notwithstanding that its three-years' output was less than three per cent.

One of the reasons that the report of this District does not measure up to what might have been expected is that there seems to be lacking a recognition of relative value of available information. The particulars given of the Similkameen District, for example, seem to indicate this. A small silver property, which shipped in 1917 about 320 tons of ore is given twenty-nine lines, while the Hedley Gold Mining Co.'s operations, which included the mining and milling of 71,207 tons of ore, are disposed of in five lines, and those of the Canada Copper Corporation, which is stated in the report to have expended on its big property on Copper mountain about \$1,250,000, are dealt with in twenty-two lines.

Notwithstanding its shortcomings, the report on this District is a useful though short summary, and will be read with interest.

The Eastern District.

The Eastern District is the most important metalli-

ferous mining district in the Province, embracing as it does the whole of the Kootenay, both East and West. An official list of all metalliferous mines in British Columbia shipping in 1917 shows that out of a total of 199 the proportion of East Kootenay is 15, and of West Kootenay 87, together, 102. In addition its coal mining industry is important, though in quite recent years less productive than several years ago; last year its gross output of coal was only 23 per cent. of that of the whole Province, as compared with 35 per cent. in 1916 and 44 per cent. in 1914. Its area is so large and its mining activities so varied and extensive that it is hardly reasonable to expect a single Resident Engineer to do it justice. Yet an endeavor was made to give more or less attention in the published report of that official to every one of the twelve mining divisions the District embraces. It seems a pity, though, that with such a favorable opportunity for giving a fair outline of the more striking features of mining and metallurgy in the District, much much prominence is given to comparatively unimportant properties than to large producers, the latter generally including those that have done, even during the year covered by the report, underground development in connection with which comment of great practical usefulness might easily have been made, and have conducted metallurgical operations that might well have been described even if only briefly. But in this report, as in nearly all the others, much more attention seems to have been given to properties, some of them in outlying regions, in connection with which applications had been made to the Government to spend money in wagon-road or trail making, than to those that are largely the mainstay of the mining industry in their respective districts. A number of instances might be cited where the sense of proportion or of appreciation of relative value seems to have been quite lost sight of. This is most noticeable in the case of the Sullivan lead-zinc mine, in Fort Streele division of East Kootenay, which is shown to have shipped 112,000 tons of ore and the development work done included extending "the new double-track tunnel" 3,000 feet, which tunnel "when completed will give an additional depth to the present workings of 700 feet, and will greatly reduce the present cost of handling the ore;" yet this big zinc-lead mine—the only one in the Province operating a "mucking" machine—was given eight lines of space, while a quite unimportant outlying group of minerals claims in Golden division, respecting one of which the report states "no ore bodies which could be considered of commercial importance have yet been opened up," and of another "it is a prospect upon which further work may possibly disclose ore in larger quantities than have as yet been found, but it is not considered that present conditions justify any heavy expenditure," has devoted to it nine or ten times as much space.

The Western District.

The report of the Western District may be designated the report of "the writer," for that expression is used in it seventy-seven times, which is about fifty times more than in the case of another Resident Engineer who also has a weakness in a similar direction. Its considerable length is easily accounted for when it is seen that "the writer" spread himself by filling eight pages with his "Outline of the Report," "Bibliography," and "Introduction."

Notwithstanding, though, that the Resident Engineer for this District gave a facile pen full play, and that needed editing was not done, there is much of interest in his report. The bibliography of the geology and mineralogy of the District, which should long since have been compiled and published by the Provincial Bureau of Mines, will doubtless prove of value to those seeking information on those matters. The information relative to copper ore deposits being developed in Victoria mining division will interest many, in the southern part of the District especially. The account of the extensive under-

ground workings of the Britannia copper mines, and the summary of the equipment and the plans of a 1,000-ton unit of its big concentrating mill are timely and of value for reference. Generally, the particulars of numerous mining properties in various parts of the District, though they might with advantage have been considerably condensed, will be welcomed by those giving attention to mining in the Southern Coast District.

In conclusion, the opinion may be expressed that as a whole the first annual reports of the Resident Engineers are not of a character to induce other Provinces of the Dominion to follow British Columbia's example in this direction. As has already been stated, the report of the Resident Engineer for the Northwestern District (No. 1) is a most creditable one; it keeps within the limits officially outlined and may well be regarded as a model that other Resident Engineers can learn from, whether their weakness be that of undersirable brevity, or the other extreme of considerable prolixity. It is certain that Ontario Mines Department officials have little to learn from these reports, in either relative proportion in dealing with various mining properties, or in the general character of the original comment made upon them. Nor are Dominion Mines Department officials likely to discover in these reports leads that they may follow with advantage. Whether or not the future will see the marked improvement that may reasonably be looked for will probably depend largely upon the adoption by the Provincial Department of Mines of method and system for future reports, or a continuance of the inaugural "go-as-you-please" style which has not proved a signal success.

WILL OPERATE WOOLSEY CLAIMS.

The Woolsey Group of mineral claims, situated on Silver Creek, a short distance from Revelstoke, B.C., have been bonded by Calgary, Alberta, financial men, for a substantial sum. Extensive development work will be undertaken immediately. The ore is silver-lead and is said to be very high grade, a test shipment being reported to return 137½ ounces silver and 73 per cent. lead to the ton, with a trace of zinc. A road is to be constructed to replace the present trail to the mines and a bridge to connect with the latter is promised over the Illecillewaet River.

CHANGES IN FRANKLIN CAMP.

Considerable stir is reported from Franklin Camp, near Grand Forks, B.C., The Maple Leaf Group, a well-known property on which considerable development work has been done and a sample shipment from which gave substantial returns in copper, gold and silver, has been bonded, according to announcement from that district, by Mr. H. W. Holly, of Winnebago, Minn., representing Chicago, Ill., financial interests. The Union Mine also is expected to be transferred under bond to American interests, negotiations being in progress, while mining engineers have been inspecting the Pathfinder, of the same section, with the same object in view.

It is reported that the Woolsey group of claims on Silver Creek east of Revelstoke have been bonded and that a large force of men will be put to work at once. The ore is high-grade silver-lead.

Mr. Charles Camsell, head of the British Columbia branch of the Geological Survey of Canada, is in the Bridge River country gathering information on mining development in order to bring up to date the report on that district, which is in course of preparation.

Ontario Mining Officials Visit British Columbia

Mr. T. Ernest Godson, Mining Commissioner for the Province of Ontario; and Mr. T. F. Sutherland, Chief Inspector of Mines for the same Province, are paying a visit to British Columbia for the purpose of making a general but close investigation of Western mining conditions.

Mr. Godson is chiefly concerned in the judicial aspect of the mining regulations. While in British Columbia disputes over mining properties are decided in the courts, in Ontario he, as Mining Commissioner, adjudicates between the parties at odds, an appeal from his decision to the Court of Appeal being open to the dissatisfied party. Some differences between the British Columbia and the Ontario regulations are referred to by Mr. Godson. There, before a claim can be recorded, it must consist of a discovery of "valuable" mineral in place, as contrasted with the requirement here of "mineral in place." The Ontario definition, he explains, is supposed to prevent what is known as blanketing a considerable section, but just how far it does so is a moot question. In Ontario, too, the Crown Grant carries everything, including surface rights, and the system of British Columbia of either work or payment on the part of the locator to cover annual assessment duty does not exist. The actual work must be done by the locator, the alternative of payment being not permitted. While unable as yet to make a full study of the mining regulations of British Columbia, Mr. Godson is of the opinion that those of Ontario are the best in existence in the Dominion of Canada, are more elastic than those of other Provinces, and meet the situation as far as possible. While in Winnipeg, Mr. Godson made a study of the new regulations which are being drafted consequent upon the expected early handing over to that Province by the Dominion of the mineral lands now held by the latter. There, as elsewhere, throughout the country, he states, there appears to be a growing sentiment in favor of the elimination of the existing system of issuing Crown Grants of mineral claims to parties who comply with the requirements as to development, etc., and the inauguration, in its stead, of a system whereunder the Government would retain perpetual ownership of their mineral lands, only granting leaseholds on liberal terms, with a penalty of forfeiture if the terms are not complied with.

Chief Inspector Sutherland is making a personal inspection of the larger mines of the Province and already has visited the underground workings of the mines at Anyox, B.C., of the Granby Consolidated Mining & Smelting Co., as well as those of the Britannia Mining Co. Both are on their present tour at the suggestion of the Hon. Mr. Ferguson, Minister of Mines of Ontario, with a view to obtaining all information available as to mining conditions in other sections of Canada for their guidance in effecting improvement in their home Province. Respecting mining conditions in Ontario at present, Mr. Godson says that mining is very active, especially in silver, copper, nickel and other metals, but that the gold producing mines are affected similarly to those of British Columbia and other parts of America. Like other Provinces, Ontario since the outbreak of the war has taken steps to protect the interests of the men overseas on active service and those holding mining licenses and interests have been given every protection pending their return.

The Hon. Frank Cochrane has been appointed acting Secretary of State and Minister of Mines during the absence of Hon. Martin Burrell, who is taking an extended vacation.

FLUORITE NEAR GRAND FORKS.

Diamond drill exploration on the "Rock Candy" property of the Consolidated Mining & Smelting Co. near Grand Forks, B.C., are understood to have disclosed a body of fluorite exceeding expectations. Meanwhile work is proceeding in preparation for substantial shipments, and an extension of the Kettle Valley Railway above Lynch Creek to connect with a tramway from the property is projected, thus facilitating the economical movement of ore.

Considerable ore has been proved up in the Drum Lummon Mine, Douglas Channel, B.C., since the installation of a new compressor plant. A concentrating mill of the Gibson type now is being constructed.

DEVELOPING EPSOMITE DEPOSITS NEAR CLINTON, B.C.

Two Vancouver companies are developing deposits of epsomite near Clinton, B.C., which have been reported upon by a competent mining engineer. The only production of epsomite in British Columbia hitherto has been from the Spotted Lakes in the Osoyoos Mining Division, where twenty men were employed last summer collecting it from the shores of these lakes, where it crystallizes, and shipping it to the United States. The output was about 900 tons from that locality.

TESTING PLATINUM ORE FROM OLIVINE MT.

The Olivine Mountain Syndicate of Vancouver has shipped two tons of ore containing platinum from Olivine Mountain, Tulameen, to the Faust concentrating plant, Seattle, Wash., for testing purpose, with a view to ascertaining whether the metal can be extracted in sufficient quantity and at a low enough cost to make the operation of the property profitable. If so the syndicate plans the installation of a plant at Tulameen to undertake the production of platinum from the dunite which carries the mineral along with gold, copper and microscopic diamonds.

ERECTING PLANT FOR CANADA COPPER.

Mr. H. R. vanWagener, of Denver, Col., comes to the general managership of the Canada Copper Corporation at an interesting period. The newly developed properties at Copper Mountain near Princeton are the scene of considerable activity. A concentrating plant to cost one half million dollars is in course of erection, and steel will be laid on the Kettle Valley Railroad branch line to this point in a few weeks. It is expected that the entire line to Copper Mountain, eighteen miles south of Princeton, will be finished by mid-summer next. Electric power is to be obtained by an extension of the West Kootenay Light and Power Company's line from Greenwood, and work has been started at clearing the right of way and building roads for the 150 mile extension.

The Harewood mine at Nanaimo recently re-opened by the new owners, the Canadian Western Fuel Company, is producing from the new workings what is claimed by officials of the company to be the best class of steaming coal on Vancouver Island.

Crow's Nest Pass Miners Stay Out

Victoria, Oct. 1.—The Coal miners of Fernie and Michel, B.C., Crow's Nest Pass Collieries, are still on strike. It was thought that when it was ordered by Mr. W. H. Armstrong, who is appointed by the Dominion Government as Director of Coal Operations in the United Mine Workers of America District No. 18, that the company should open its mines on the single shift system, and that the Minister of Mines for British Columbia should be requested to appoint a Royal Commission to investigate and report as to whether the adoption of the one shift in twenty-four hours will make the mines safer than the double shift rule, the men would go back to work without further delay. That, however, did not happen. When the men had the proposition put before them on Monday, September 30th, they voted it down solidly.

What will be the next move? This is the question interesting those who have been watching developments. Mr. Armstrong admittedly is confronted with a serious situation. Several of British Columbia's most important coal mines are idle and the continued lack of output would have the effect of depriving a number of large and, at the present time, essential Western industries of the coke necessary to keep their plants in operation. The company which first comes to mind as being placed in this position is the Trail (B.C.) Smeltery, Consolidated Mining & Smelting Co. of Canada. Last year it suffered when the Fernie strike, following the explosion of April, 1917, occurred and the authorities are determined that such a difficulty will not arise again. Moreover, Mr. Armstrong has taken a step which is pretty definite, having invoked the very extensive authority placed in his hands by the War Measures Act of Canada under the terms of which his appointment was authorized. It is interesting, in this connection, to reproduce the text of Mr. Armstrong's order, which follows:

"A request has been received from the miners employed at the mines of the Crow's Nest Pass Coal Company, Ltd., at Coal Creek and Michel, for the adoption of a single shift in all the mines instead of a double shift as at present. This request is based upon what is alleged by the men as 'the dangerous condition of the mines' due to working double shift.

"The question of the safety of the above mentioned mines is one that comes under the regulations of the Coal Mines Regulation Act of British Columbia, and therefore, comes within the jurisdiction of the Department of Mines of that Province, and not under the jurisdiction of the Director of Coal Operations.

"The issue as to whether or not the operation of those mines would be more dangerous on a double shift than on a single shift is one upon which the representatives of the men and the company disagree.

"However, in view of the difference of opinion which has developed I hereby instruct the Crow's Nest Pass Coal Company, Ltd., to install a single shift system at their mines and will request the Minister of Mines of British Columbia to appoint a Royal Commission as proposed by him to determine the question at issue. The Commission to report without delay when the matter under dispute will again be reviewed.

"It is further understood that the single shift system does not apply to development places nor to necessary repairs in the mines.

"By virtue of the authority vested in me by order of the Committee of the Privy Council, passed under the provisions of the War Measures Act of Canada, 1914, I hereby direct the foregoing conditions shall be in force and effect at the mines of the Crow's Nest Pass Coal Company, Ltd., until further notice."

W. F. ARMSTRONG, Director of Coal Operations.
Calgary, Alberta, Sept. 27th, 1918.

Some difficulty is being experienced in understanding the attitude of the men in refusing to endorse such a proposal as it grants them that for which they struck, namely, the single shift, without insisting that any condition or conditions be accepted. The only explanation ventured is that they object to the proposal that the Provincial Government appoint a Royal Commission as indicated.

In the face of this deadlock there seems to be only two courses open: first, the granting of the men's demands as set out by themselves without reservation or qualification of any kind. Second, the continuance of the fight. The adoption of the latter course according to officials of the U.M.W. of A. would mean the calling out of all the coal miners of District 18, affecting probably some 9,000 men. What action Mr. Armstrong would feel called upon to take in such a case is hard to say, but it is significant that the military can be empowered to enforce orders given under the War Measures Act if necessary.

Hon. Wm. Sloan, Minister of Mines for British Columbia, returned recently from Calgary where he engaged for a week in conference with officials of the U.M.W. of A. and representatives of the company in an endeavor to come to some amicable and satisfactory adjustment of the issue. All proposals made by him, however, were without avail and finally he requested Mr. Armstrong to take the matter in hand. The result was the order quoted.

In discussing the matter subsequently, Mr. Sloan explained that District 18, so-called, includes the Eastern section of British Columbia and the whole of the Province of Alberta. It was a division of the Canadian coal mining fields for which the U.M.W. of A. was responsible. Within its limits, he pointed out, there were fifty-one shipping mines and forty-two Local Unions, three of the latter being in this Province and thirty-nine in that adjacent.

Referring to Mr. Armstrong's services in this District, Mr. Sloan paid him a very high compliment. Since taking office, Mr. Armstrong had contended with many problems, both serious and trivial, and had handled all with consummate tact and judgment, bringing about satisfactory understandings in each instance. Through his efforts and influence the coal output of the District for the first six months of this year had exceeded that of the same period of 1917 by 1,060,000 tons.

An adequate supply of steam fuel, Mr. Sloan thought, was assured for the winter, and he did not believe that there was occasion for undue alarm with regard to the domestic fuel reserve for the prairies during the next few months. It was the effect the strike would have on the coke supply that was most to be feared and it was this that made a settlement of the trouble imperative.

Incidentally the Minister of Mines asserted that, in his judgment, the Eastern British Columbia and Alberta fields were the "coal cradle" of the American Continent, and would be the scene of the greatest mining activity of any American section in the course of the next few years.

A two-room addition to the Creighton Mine school is under construction by the Laberge Lumber Co., Limited, to be ready for occupation by the end of October. The addition is a continuation of the design and construction of the present school building, is of brick veneer with stone basement, and will be modern throughout, and when completed will give Creighton a six-room school. There are now 462 children of school age in Creighton Mine.

A high grade copper ore is being shipped to the Tacoma Wash. Smelter by the Monitor Mine, Vancouver Island, B.C., and it is proposed erecting a concentrating mill.

LUCKY JIM RE-ORGANIZED

The new directorate of the Lucky Jim Mines, Limited., has issued the first financial statement issued to stockholders since 1914. For many years the affairs of the company have been tangled due to the over-issue of stock by Mr. G. Weaver Loper, former managing-director and transfer agent, who now is in jail in Spokane, Wn., following charges made by the prosecuting attorney. This statement shows that from April, 1914 to April, 1918, the income was \$249,874 of which \$228,161 was from ore shipments made by Mr. A. G. Larson as trustee. Of income \$20,680 was from loans. Expenditures totalled \$246,721, leaving a balance of \$2,653, with \$14,966 paid to trustees, \$6,142 to creditors, \$32,822 first mortgage retired, and \$20,149 paid as interest upon mortgages. Office expenses for the period were \$15,703 and operating expenses \$155,975. Listed as over-issued shares an item of \$2,999,899 was shown on the balance sheet and \$2,121 was shown as due from smelters. Liabilities included debentures to the amount of \$6,200, \$38,087 due on second mortgage, \$27,004 accounts payable, and \$18,533 for loans. The total assets were \$5,533 with indebtedness of \$71,291, or a net deficit of \$65,758.

The company has issued the following statement with reference to past difficulties and future plans:

"The quantity of ore produced could have been very materially increased if this company had owned a concentrating plant. At the time the receiver was appointed the only mill available was one situated at Sandon, B.C. Some ore was sent to this mill for treatment, but unfortunately before this ore was treated the mill was destroyed by fire and it became necessary to look elsewhere for milling facilities. Fortunately the receiver was able to make a contract with the lessee of the Roseberry mill to treat our ores and the first concentrates were produced by this mill the latter end of October of the same year. This mill was operated by the lessee until October last year when it was taken over by the Surprise Mining Company. During the period it was in operation by the lessee about 16,000 of crude ore was treated. September, 1916, the customs concentrator at Kaslo commenced operations and a quantity of middlings was transferred from the Roseberry Mill to the Kaslo Mill for magnetic treatment. Two months later this mill commenced concentrating and treated about 6,000 tons of crude ore for this company during the period it was in operation, but, owing to circumstances it closed down January last, thus leaving the mine without any concentrating facilities. Neither the Roseberry nor the Kaslo mill was satisfactory as owing to lack of necessary equipment, the efficiency was considerably below what it should have been, resulting in low extraction; while, on the other hand, the milling costs were much higher than if the ore had been treated in the company's own mill. Had the price of zinc been maintained it might have been possible to continue but at the present price it was impossible to pay the high treatment charges and make any profit on the ore.

"Efforts are being made to raise sufficient money to erect and equip an up-to-date mill on the property of the company.

"You are aware that on the 12th of January last, an extraordinary general meeting of the members was held in Victoria and the capital stock of the company increased from \$2,500,000 to \$6,000,000, said action being confirmed by a subsequent extraordinary general meeting held on the 2nd February last.

"The reasons your directors called these meetings for aforementioned purposes were as follows:

On taking office in December, 1916, they found it was not possible to prepare a financial statement or have an audit made of the books of the company on account of the

refusal of Mr. G. Weaver-Loper, late vice-president and managing director of the company, to turn over the books and documents of the company to the present secretary. An application was, therefore, made to a judge in Spokane for a writ of mandamus to compel Mr. Loper to deliver said books and documents, also three thousand debentures or bonds amounting to \$150,000 of the company held by him. Said writ was issued but Mr. Loper appealed against the same.

"Last year F. P. Green, certified accountant of Spokane, was instructed by the board to make an audit of the transfer books. This audit and a subsequent audit disclosed an over issue of approximately 3,000,000 shares. Upon completion of aforementioned audit your directors called an informal meeting of members in Spokane, representing a majority of the shares issued, and after consulting the best legal authorities in British Columbia and Spokane, they were advised that to avoid litigation the only thing to do was to increase the capital stock to \$6,000,000 to cover said over-issue.

"At the time the conditions above mentioned were exposed, Mrs. Fannie G. Loper, wife of G. Weaver Loper, late vice-president and managing director of the company, had a suit pending against the company in the sum of \$220,644, covering a claim of G. Weaver Loper for \$73,340 contained in the last financial statement issued to members; certain salary and expenses of administration amounting to about \$30,000 and sundry other claims of which your directors have no knowledge. On the 27th of November, 1917, an assignment was obtained from Fannie G. Loper and G. Weaver Loper of all their claims against this company, surrendering all or any property of said company in his possession and in addition to the above an affidavit was also made by Fannie G. Loper and G. Weaver Loper of which the following is an excerpt:

"That no person or corporation has any claim of any kind, nature or description against the company on account of any matter or thing whatsoever, and especially on account of any stock, share or shares of stock, certificate or certificates for share or shares of stock other than is shown by the audit of the transfer books and subsequent audit made by F. P. Green, of Spokane, Wn."

"On the 15th of March last, a meeting of directors was held at which it was resolved to issue to A. M. Wolverton, of Vancouver, debentures aggregating \$6,200 in respect of his garnishee proceedings in re Wolverton vs. G. Weaver Loper, said Wolverton giving the company a release of all claims under said judgment.

"A resolution was also passed authorizing the officers of the company to take up and cancel all the shares shown to be out-standing by the audit before mentioned and to issue in lieu thereof new stock, share for share and to re-number all such certificates and shares beginning with one (1) and so on until all the stock has been re-issued."

Ottawa, Oct. 8.—Word has been received at the Department of Labor that the coal miners who have been on strike in the Crow's Nest Pass region voted to return to work on the lines laid down in an order issued by W. H. Armstrong, Director of Coal Operations in the West. Work, it is stated in the communication received by the Department, was resumed this morning. The men have been out for nearly a month.

J. Murray Clarke, K.C., in National Progress, claims that the decrease in gold production on the Continent is due to German propaganda. The German government, he says, voted \$250,000,000 for the purpose of interference with Allied production, and the United States government has traced the expenditure of \$90,000,000 in that country, partly in the purchase of newspaper support. The German government worked through the I. W. W.

Milwaukee Meeting of Mining Engineers

Milwaukee, Wis., Oct. 9th.—A clarion call to conserve tin, which may be heard around the world, was sounded here to-day at a meeting of the American Institute of Mining Engineers when representatives of the Government and many of the country's largest firms conferred.

Collect tin for our use, substitute other metals for tin whenever possible, and discontinue the manufacture of tin-consuming products non-essential to the winning of the war. These were the advices made public after the conference.

Those in attendance represented the War Industries Board, National Lead Company, Pennsylvania Railroad, U. S. Bureau of Standards, American Sheet and Tin Plate Company, Westinghouse Electric and Manufacturing Company and several scores of others.

Conserving tin was the principal subject of the conference, together with a study of means for increasing the by-products of coke and the fuel supply in the United States. The statement was made that from certain coals it is now possible to secure nearly 20 gallons of gasoline or motor fuel of the same value per ton of coal mined. Among other things, a new type of coke, known as semi-coke, has been produced, which it is said has proved a satisfactory fuel for all general purposes. The advantages of using coal in pulverized form or of using briquet, or a new fuel, known as carbocoal, were discussed at some length and in several instances statements were made showing that enormous sums have been spent in order to make these substitutes for coal available to the domestic and industrial consumer during the coming winter.

To-day motion pictures were shown before the engineers in regard to concrete ships, pointing out the important part which ships are playing in the life of the world; the paramount importance of cripples in the manufacturing industries, indicating the wide uses that can be made of them in the mine world; and the Triplex Steel Process.

At the Institute of Metals Division of the Mining Engineers Institute the following subjects were presented in the course of the day: "Conservation of Tin"; "The Volatility of the Constituents of Brass," by John Johnston; "The Effect of Impurities on the Hardness of Cast Zinc or Spelter," by G. C. Stone; "Dental Alloys"; "Electrolytic Zinc," by C. A. Hansen; with discussion by J. L. McK. Yardley; "The Condensation of Zinc from its Vapor," by C. H. Fulton; "The Action of Reducing Gases on Copper," by Norman B. Pilling.

At the Iron and Steel Section meeting the following subjects were presented: "The By-product Coke Oven and its Products," by W. H. Blauvelt, with discussion by A. K. McCosh; "The Use of Coal in Pulverized Form," by H. R. Collins; "Carbocoal," by C. T. Malcolmson, with discussion by W. Rowland Cox, J. M. Fitzgerald, Newell W. Roberts, F. R. Wadleigh, Charles Catlett and Charles M. Barnett; "Low-temperature Distillation of Illinois and Indiana Coals," by G. W. Traer; "Price Fixing of Bituminous Coal by the U. S. Fuel Administration," by Cyrus Garnsey, R. V. Norris and J. H. Allport.

A substitute for radium, the world supply of which is only about three ounces of radium element, has been found, according to a statement presented by Dr. Richard B. Moore, of the U. S. Bureau of Mines. Mesothorium is the radium substitute which, according to Dr. Moore, is excellent in many ways. This can be used, it is said, just as efficiently for radium as luminous paint and it is this use to which radium is being especially put in the work on airplane dials, compasses and gun-sights. In these uses it has greatly increased the efficiency of night firing both with machine guns and artillery. The substitute can also be used for cancer treatment, although

the fact that it has a shorter life makes it much less desirable for this purpose.

Its usefulness in luminous paint will continue for four or five years, which is as long as it is required for cheap watches, push buttons, etc., and which will prevent the use of radium for such purposes, as in some instances it is now being used in wasteful fashion.

The result of Dr. Moore's experiments met with great interest on the part of the mining engineers and excited considerable discussion.

The future peace of Europe depends upon the disposal of the iron ore resources of Alsace-Lorraine. This is an opinion which was reflected in a study of the iron ore resources of the world, made by the Iron and Steel Section.

Although, it is pointed out, enormous resources of iron ore will be available to the world when shipping facilities are adjusted, probably no working basis can be reached to meet the iron ore needs of Southern Europe unless the mines of Alsace-Lorraine are left in the hands of the Allies. In the same session it was stated that the iron ores of Brazil are certain after the war to play an important part in the economic reconstruction of Europe and perhaps in the development of America. It was stated to the engineers that by efficient management these ores could be landed in Europe or the United States at a profit despite a contrary opinion which has been widely circulated.

The meeting is being held in conjunction with the American Foundrymen's Association and the American Malleable Castings Association and engineers are present from practically every metal producing centre in the country. In Machinery Hall a notable exhibit of metallurgical and mechanical processes and products was displayed at which over 165 firms are represented.

Among subjects taken up by the Institute of Metals Division of the American Institute of Mining Engineers were: "The Metallography of Tungsten," by Zay Jeffries, with discussion by Sir Robert Hadfield; "The Constitution of Tin Bronzes," by S. L. Hoyt; "Oxygen and Sulphur in the Melting of Copper Cathodes," by S. Skowronski; "The Relation of Sulphur to the Overpoling of Copper," by S. Skowronski, with discussion by Phillip L. Gill.

The subjects presented by the Iron and Steel Section of the Institute were as follows: "The Work of the National Research Council," by H. M. Howe; "The Limonite Deposits of Mayaguez Mesa, Porto Rico," by C. R. Fettke and Bela Hubbard; "The Manufacture of Ferro-alloys in the Electric Furnace," by R. M. Keeney; "The Manufacture of Silica Brick," by H. LeChatelier and B. Bogitch; "Notes on Certain Iron-ore Resources of the World"; "Recent Geologic Development on the Mesabi Iron Range, Minn." Discussion by Anson A. Betts and J. F. Wolff.

Henry E. Cooper, Vice-President of the Equitable Trust Co., in an interesting treatise entitled, "The Gold Situation," declares that of the many financial and economic problems which the international developments of the last four years have brought to the fore, one of the gravest is the maintenance of the gold reserve.

It is understood arrangements have been made for the resumption of mining operations on the Huronia mine at Beaverhouse Lake, in the Larder Lake District. A number of men have already been engaged.

During the week ended October 4th, eight Cobalt companies shipped an aggregate of 13 cars containing approximately 912,802 pounds of ore. The McKinley-Darragh with three cars containing 211,609 pounds was the leader. A feature of the weekly statement is the appearance of the Peterson Lake once more on the shipping list.

NEWS FROM BRITISH COLUMBIA

NEW REGULATIONS FOR COAL DISTRIBUTION

Fuel Controllers and coal mine operators have received notice from Ottawa, that regulations providing for the more uniform distribution of coal needed for industrial uses in Canada have just been approved by the Governor-in-Council at the instance of the Canadian Fuel Controller.

They provide that all mine operators in Canada and importers of industrial coal in this country shall rotate delivery of coal among their customers in proportion to their requirement so that no one shall at any time have advance supplies on hand while others are under-supplied.

A preference list of coal consumers is also outlined in the regulations. Those preferred consumers include railways, military and government buildings, public utilities, retail dealers and manufacturing plants chiefly engaged on war contracts. These must be given preference in supply over all other users in the order named.

Drastic provision also is made against the unnecessary hoarding of coal on the part of industrial users and heavy penalties are provided. Those whose operations required large advance stocks at the end of the present coal year must obtain special permission from the fuel administrator. Provision is made whereby mine operators and importers may require certified statements from their customers, as to the tonnage of coal on hand and required for each month, so that an equal distribution may be made of all coal mined and received in Canada.

PROSPECTING FOR PLATINUM ON TULAMEEN RIVER

Mining and prospecting for platinum on the Tulameen River, British Columbia, is going forward briskly, having been materially stimulated by the interest representatives of the Geological Survey Branch of the Dominion Government are taking in this work. The Church company, of Tacoma, Wn., is extensively developing property on the Tulameen above Bear Creek, having put in a big dam and a flume 200 yards long. A force of twenty men with three large centrifugal pumps is working the bed of the river over a distance of over 700 feet and is reported to be recovering considerable platinum and gold. Several smaller outfits are at work and the Government, having established camps at Slate Creek, is sinking test holes on the bars and benches to determine the value of the ground to bedrock.

HON. MR. BURRELL IN BRITISH COLUMBIA

Hon. Martin Burrell, Minister of Mines in the Dominion Government, is visiting British Columbia. He is going to Nelson first, where he will investigate the question of the production of zinc and lead. Mr. Burrell has announced that while in the West it is his intention to investigate the prospects of increasing the output of platinum, "as British Columbia promises to be the best source of supply."

GASOLINE FROM ALBERTA NATURAL GAS

It is possible that gasoline will be produced in commercial quantities from gas wells in the Province of Alberta, as a result of investigations carried out by Dr. D. B. Dowling, of the Dominion Geological Survey. At one large gas well south of the city of Calgary a plant already is in course of erection for the extraction of gasoline from the gas. While the flow of gas at the wells in question is sufficient to meet any ordinary commercial demand, the city of Calgary is supplied from other wells and, as there is little chance of another franchise being granted, the owners of the former are turning their attention to the production of gasoline. Because of the scarcity of this fuel the Dominion Government is conducting a thorough survey of the natural gas district with a view to increasing Canada's available supply of gasoline.

RE-OPENING DONOHUE MINE

The Donohue Mines Corporation has re-opened its mining property at Stump Lake, Merritt (B.C.) District, mining engineers having given assurance, according to report, that it can be developed into one of the best mines of the interior of the Province. Descriptions given are to the effect that it is traversed by a series of true fissure veins, all of which carry good values in copper, gold, silver and lead, with some zinc. New machinery and equipment is to be installed, including air compressors and drills, additions to the hoisting plant, etc. It is likely that a new concentrator will have to be provided. Mr. John D. Leedy, of Seattle, Wn., will be the new manager.

To encourage residents of the village in growing vegetables and beautifying their home surroundings the Mond Nickel Company has for a number of years offered cash prizes for the best results obtained in this direction. The results have been most gratifying and this year over ninety-nine per cent. of the village lots are producing vegetables.

At the 100-foot level of the Bourkes Mines at Bourke's Siding, drifting has been carried a distance of about forty feet and the present face is said to be in good ore. Some exceptionally rich ore has been taken out of this working and from a small shipment recently made the company got a return in the neighborhood of four hundred and eighty dollars.

Arrangements have been made for the resumption of operations at the property of the Huronia Mining Company, in Gauthier Township, in the Larder Lake District and a number of men have already been engaged. This property has had a somewhat checkered career, since the first gold discoveries were made there several years ago. The property was sold to a company organized for its extensive operation. Later it passed to the Timmins interests of the Hollinger Consolidated Mines who secured a working option during the tenure of which a considerable amount of diamond drilling was done, with only fairly satisfactory results, which led to the option being allowed to expire. Other interests have since made efforts to operate the property, but up until the present time these efforts have never met with a great deal of success. Just what the plans of the present operators are has not yet been announced.

Claims situated in the Townships of Ogden and Mount Joy in the Porcupine District owned by Philadelphia interests known as the American Porcupine Gold Mines are undergoing exploration, a small force of men being engaged in the work.

Gold mining will doubtless be very active next year. The war has naturally seriously hampered gold production. The end of the war will doubtless soon be followed by the greatest activity the gold mining districts have yet seen. Developments in Northern Ontario during the war have been remarkably good and a return to normal conditions, or nearly normal conditions, will result in great increase in production of gold.

The editor of the Mining Institute Bulletin is apparently of the opinion that the Government has not handled coal production and distribution in a very satisfactory way. Many will agree with him. Comparisons with the United States are hardly fair however. We have been at war for four years and the United States has had every opportunity to profit by our mistakes.

A TRIBUTE TO JAMES DOUGLAS

At the Colorado Meeting of the American Institute of Mining Engineers on September the 3rd, a service was held in commemoration of the late Dr. James Douglas. The Canadian Mining Institute was represented officially by Mr. E. P. Mathewson, who delivered the following address:

"In my early youth I knew of no name in science to compare with that of Dr. Douglas. He was associated many years with the late Dr. T. Sterry Hunt, and Dr. Hunt was the immediate cause of my coming to the United States from Canada and entering on my professional career in this country.

"Dr. Douglas was a man of most benevolent disposition, far-seeing in many ways, who, though possessed of much wealth, thought nothing of money; he had not the love of money at all. The only use he had for money was to do good to those who needed it.

"Dr. Douglas was particularly thoughtful of his Canadian fellow countrymen and particularly of those who were engaged in scientific pursuits. The educational institutions of Canada were frequently benefited by his benevolence. McGill University was highly favored by Dr. Douglas, after he learned of the financial difficulties of that institution. McGill, not being granted any aid from the state, and relying upon private benevolence, had outstripped its income in giving what it could of educational advantages to Canadians, and it became necessary at one time to have a campaign for more funds. In this campaign Dr. Douglas responded nobly and was the means of getting the necessary funds to go on with the good work of that University. The University from which he graduated, Queen's University, was also frequently aided by his benefactions. Altogether, the sums given by him during his lifetime to Canadian institutions would be probably up in the millions, but he was so unobtrusive and so retiring in his disposition that he seldom allowed his name to be used in connection with these matters unless it was possible, by using his name, to influence others to similar benevolence. Anywhere in Canada, if you mention the name 'Douglas,' you will find people who will say at once, 'That was a great Canadian, a man we all revered.'

"Dr. Douglas had the broadmindedness to introduce the open door into metallurgy. Prior to his advent into the metallurgical field, the non-ferrous metallurgists in this country, in Canada, and practically all over the world, were absolutely oyster-like toward visitors. No one was admitted who did not have a letter of recommendation from one of the Board of Directors, at least. But Dr. Douglas, early in his career in this country, allowed every one to come to the plant and visit the mines with which he was connected. He welcomed them, and argued that he was getting as much benefit from the visitors as the visitors were getting from him.

"The example of Dr. Douglas was followed by many metallurgists in this country, and to-day we may say that there is hardly a non-ferrous metallurgical establishment in the United States and Canada to which a person, who is honestly seeking information, cannot obtain access. Of course, during war times a few precautions are taken for fear that information might get to the enemy. This, of itself, is enough to make Dr. Douglas called a great man, and to let his name go down to posterity as really the father of open-door metallurgy."—(C. M. I. Bulletin.)

If it is all that is represented a new copper property has been located in the Arrowhead Lake District, near Revelstoke, B.C., which is likely to be heard from. Some samples are said to have been produced assaying \$50 to the ton. The claims are near the water so that the question of transportation is not difficult of solution.

PERSONAL

Mr. H. H. Lavery was in Toronto last week.

Mr. A. Sancton was at the McIntyre mine last week, and has returned to Montreal.

Mr. E. Craig is foreman at the Otisse mine of the Colorado Ontario Development Co., Matachewan area.

Dr. H. C. Cooke visited the Otisse mine last week.

Mr. "Mike" Kennedy is at the O'Brien mine, Cobalt.

Mr. R. E. Hore has returned to Toronto from Northern Ontario.

Mr. H. R. VanWagenen, the new general manager of the Canada Copper Corporation, has arrived in Princeton, B.C., from Denver, Colo., and is taking up his residence at the scene of the company's operations, Copper Mountain. Mr. Oscar Lachmund, the retiring general manager, will spend the winter in Spokane, Wash. The company's headquarters staff presented the latter with a testimonial on the occasion of his departure in the shape of a handsome suitcase.

Mr. A. R. Whitman has given up consulting practice until after the war, being now an instructor in War Topography at Columbia University.

Mr. Arthur L. Day announces a change of address from Geophysical Laboratory, Washington, D.C., to Corning Glass Works, Corning, N.Y.

Mr. Robt. Bryce was in the Gowganda District last week.

Mr. N. H. Newman is in the Matachewan District.

Mr. W. D. Matthews, President of the Consolidated Mining & Smelting Co. of Canada, accompanied by Mr. C. B. Hosmer, a director of the Bank of Montreal and Mr. Walter O. Miller, District Superintendent of the Canadian Pacific Ry., recently visited the Trail, B.C., Smelter. They thoroughly inspected the smelter from the ore bins to the acid plant, including the blast furnaces for copper and lead, the refineries for both, the roasters and the zinc plant.

Dr. F. W. Farrier, representing the Munition Resources Commission of Canada, and Mr. R. Graham, assistant professor of Mineralogy at McGill University, are making a trip into the heart of the Cascade Range, British Columbia, to inspect mica deposits. Wm. Schmock, who is with the party, is the discoverer of the mica in question and, having succeeded in interesting the Dominion Department of Mines in his find, is escorting and guiding the authorized investigators to his claims in order that they may make a report. As is well known mica is much needed for the manufacture of war necessities.

The Eureka Mine.

The Minister of Mines Report for 1917, refers to the Eureka Mine of the Nelson Mining Division (B.C.), as the chief copper shipper of that section and states that certain improvements of equipment were underway which would permit the shipment of 50 tons a day sometime this year. More recent news of this property is to the effect that this work has been completed and that the plant is in shape for the increasing of output to the point predicted. A lease has been taken on the power plant of the Kootenay Gold Mines and an air line 6,000 feet in length constructed. Air drills have been installed, thus doing away with hand drilling and materially facilitating development. Other work done of a preliminary nature includes the repairing of the tramway and wagon road and the timbering of the mine. The Eureka has shipped 5,000 tons of ore, has about 9,000 tons blocked out, and it is considered that the prospects of developing a great tonnage are excellent. The ore averages about \$15 a ton in silver and copper. The Inland Mining Company, with headquarters at Walla Walla, Wash., has taken over this mine from the original Eureka Company.

THE GOLD CONFERENCE AT SPOKANE

The Gold Conference, which was held at Spokane, Wash., on September 5 and 6, was attended by Wm. Fleet Robertson, Provincial Mineralogist, as the representative of the Province of British Columbia. Mr. Robertson states that those present, among whom were deputations from the States of Washington, Oregon, Idaho, and Montana, were agreed that the monetary value of an ounce of gold was so well established at \$20.67, and accepted by all civilized nations as the basis of national and international financial transactions and credits that no change could even be considered, at least at such a time as the present with the world at war. It was, therefore, impossible to raise the selling price of gold, it being the standard of monetary measurement. It was undisputed, Mr. Robertson declares, that the actual cost of producing an ounce of gold from lode mining as compared with pre-war costs had increased from 50 to 75 per cent. It was shown that a large percentage of the gold mines under present conditions could not produce gold at a profit with gold at \$20.67 an ounce and had shut down, while with many others the profits had been reduced to so nearly the vanishing point that the owners had or were about to shut down until operating costs became lower which naturally meant until after the termination of the war. Mr. Robertson pointed out that certain copper properties in the aggregate produced a large quantity of gold, yet in these properties the gold was merely a by-product, only from 5 to 10 per cent. of the total values being gold while the remaining 90 to 95 per cent. was in copper, the value of which latter metal had increased so greatly, that this class of mine at present was making excessive profits and did not need any assistance. He attempted to get a definition of what a "gold mine" was, as none of the British Columbia mines produce gold exclusively. The sense of the meeting, however, was that assistance should be sought for any mine producing gold, in whatever proportion such gold might be to the total values contained in the ores. In summing up the results Mr. Robertson stated that the suggestions of Mr. F. A. Ross, vice-president of the Northwest Mining Association, had been endorsed, emphasis being given that recommending a bounty on gold produced. The suggestions offered by Mr. Ross may be summarized as follows:

(1) The recognition of gold mining as a war industry with special privileges as to taxation, priority in obtaining

supplies, transportation and labor, etc. (2) The immediate induction of labor, as has been done in the case of the lumber industry. (3) The building of trunk line motor truck roads necessary to the building up of commercially inaccessible gold fields, precisely as the spruce forests have been made accessible by Government-built railroads. (4) The extension of financial aid to such properties as may be judged by qualified Government specialists to be capable of producing metals essential to the conduct of the war. (5) The granting of a bounty on all new gold produced by the mines of the United States; and the same to be paid by the Canadian Government on new Canadian gold.

The chief resolutions adopted at the Conference follow:

Memorial to governments of the United States and Canada requesting in aid of the gold mining industry, priority rights; assignment of labor to mines; motor truck roads to commercially inaccessible gold fields; government financial aid to approved properties and bounty upon new gold as determined from time to time by the proper authorities.

Requesting Northwest Mining Association to appoint a committee to continue work of Conference and co-operate with American gold conference.

Endorsing action of Oregon Bankers' Association, which went on record in favor of "appointing by the Secretary of the Interior of a committee to study the increased cost and the decreased output of gold, in order that the gold production of the United States may be maintained at its pre-war volume."

Urging the President of the United States to appoint "a man whose success and experience in mining thoroughly qualifies him for the position" upon the Industrial Commission to be sent to Siberia.

Urging upon Congress that relief from annual assessment work upon mining claims, now covering the years 1917 and 1918, be extended to include the calendar year after the termination of the war.

Urging that, to relieve the labor shortage, men in military training be permitted to work in mines under proper rules for pay and protection and that men slightly disabled be given opportunity to perform such work.

Urging that property owners in adjacent mining districts make reports upon local conditions to committee appointed by Northwest Mining Association for use in furtherance of the objects of the Conference.

Mr. Robertson submitted the following analysis of the lode gold output of British Columbia:

LODE GOLD OUTPUT OF BRITISH COLUMBIA.

Source from which obtained	1914		1917		1918 Estimate	
	ounces	\$	ounces	\$	ounces	\$
Stamp Milling.....	60,477		40,480	836,722	35,000	
Smelting—						
Gold-Copper Ore.....	138,867		36,314	750,610	50,000	
Copper-Gold Ores.....	44,502		33,890	700,506	32,000	
Silver-Lead Ores.....	3,324		3,765	77,823	3,500	
Miscellaneous.....			74	1,529		
	247,170	5,109,004	114,523	2,367,190	120,500	2,490,735
Placer Gold.....	28,250	565,000	24,800	496,000	17,500	350,000
Total Gold.....		5,674,004		2,863,190		2,840,735

1917 PERCENTAGES OF VALUES IN ORES AS CLASSIFIED.

	Gold	Silver	Copper	Lead	Tonnages
Stamp Milling.....	97.30%	2.70%			72,071
Smelting—					
Gold-Copper Ores.....	58.45%	4.04%	37.50%		107,712
Copper-Gold Ores.....	4.31%	2.34%	93.35%		2,025,124
Silver-Lead (dry ores)....	46.62%	53.38%			4,078

SPECIAL CORRESPONDENCE.

BRITISH COLUMBIA.

Ore shipments to the Trail (B.C.) Smelter had reached the total of 239,197 tons early in the month of September.

Roaster Building Destroyed by Fire.

Fire threatened to destroy the entire plant of the Canadian Consolidated Mining & Smelting Co., Trail, B.C., recently but, fortunately, was got under control before advancing too far, with a total monetary loss of only \$40,000. The Dwight and Loyd roaster building and contents were completely destroyed. This structure was one of the oldest of the plant, having been erected with hewn timbers about twenty years ago. It was oil soaked and an easy prey to the flames. The only explanation of the outbreak given is that the oil ceased to flow to the furnaces for a time and then recommenced. Without being noticed with the result that it became ignited by the hot furnaces. The work of rehabilitation is being hastened and will not take long, the destruction of six electric motors, one of 100 h.p., two of 50 h.p., and the others in smaller sizes being the most serious in point of replacement. It is not thought, however, that the work of the lead plant will be held up as there are old roasters which can be used if required. A new wooden building is likely to be constructed for temporary use, a steel structure taking its place as soon as it can be erected.

Asks Removal of Royalty on Gold.

There is a demand among the companies and the placer miners of the Yukon Territory for the removal of the present royalty exacted on the gold output of that section of Canada. Consequently Dr. Alfred Thompson, member of the Dominion Parliament for the Yukon, has announced that at the next Session of the Parliament, he will ask that, as a war measure, the said royalty be removed. He thinks that this can be done easily by introducing an amendment to the Yukon Placer Mining Act. Dr. Thompson asserts that his constituents are not requesting too much in view of the increased cost of mining and the desirability of encouraging the output of gold to assist the Allied Countries in meeting the extraordinary financial obligations caused by the war.

The Increased Charges for Smelting at Trail.

An increase in the charge for smelting to \$8.30 a ton as against \$7.50 is announced by the Canadian Consolidated Mining & Smelting Co. It is contained in a circular issued by General Manager S. G. Blaylock, which is dated August 31, and reads as follows:

"In our circular of July 31, we advised you of an increase in the price of coke amounting to 40 cents a ton and stated we understood that further increases were being made. We now have definite advice of these increases. They are, first, a further increase, effective August 1, ordered by the director of coal operations, in the first cost of coke, amounting to 36 cents a ton, and, second, an increase by the railway commission in freight rates of 65 cents a ton. The total increase therefore since Schedule B was published in the price of coke is \$1.41 a ton. Under the terms of Schedule B we are accordingly increasing the base rate of 25 per cent. of this or 35 cents per ton of ore.

"Our circular of July 31, has already advised you of the increase of 45 cents a ton on account of wage adjustments.

"The total increase of the base rate effective August 1, 1918, is, therefore, 80 cents a ton, making the base rate now \$8.30 a ton instead of \$7.75.

"The freight adjustment in the lead sale price advised in our circular of July 31, is more than covered by the recent advance in freight rates on the competing lead from American points, so that this adjustment is compensated for by the increase in the lead prices in Canada."

Activity in Kootenay District.

That men in the gold mining industry find themselves in an unenviable position by reason of high costs of production, and the stationary price of gold is a statement made by Mr. Fred. A. Starkey, President of the Associated Boards of Trade of Eastern British Columbia, after a recent tour of the Province. He expressed the opinion that the government eventually would have to relieve the condition by bounty or premium of some sort if gold production is to continue. Mr. Starkey states that, with the exception of gold mining, never in his experience has he found the mining industry of the Kootenay District of British Columbia more prosperous.

"Since the outbreak of the war," he said, "the silver-lead properties of the Slocan District have been reopened and without exception are doing splendidly. Properties which had been closed down and which it was not expected would operate for a long time if ever are producing more metal than ever before. Mr. Clarence Cunningham, who has been operating in the Slocan for a comparatively short time, is now building a concentrator at Three Forks, B.C., to serve the properties on the Sandon, B.C., side of the range. He first obtained the Queen Bess which with little work was made a consistent producer and he also now controls the Sovereign, Wonderful, Van Roi, Alamo-Idaho, and Wakefield, all of which are producing silver and lead. The Van Roi and Hewitt have their own mills, and the new one will serve the other properties. The plant is to cost about \$150,000.

"The Rosebury-Surprise Company at Sandon, has just taken over the Ivanhoe and the Canadian, which are old mines. The Slocan Star is another fine property and work is being continued on a nine-foot vein in the old workings under the management of Mr. R. H. Stewart. Some first-class ore is being taken out.

"Mr. C. F. Coldwell is working on the old Utica which is shipping again. I understand that the Cork-Province is working full blast and development in this section is greater than ever before.

"Coming into East Kootenay the Sullivan Mine, owned by the Canadian Consolidated Mining & Smelting Co., is the biggest shipper. Another big producer is the Paradise at Wilmer, B.C. The old North Star and other properties were acquired recently by the Federal Mining Company of the United States.

"A most encouraging feature of this year's operations is the fact that many leases have been taken throughout the District, and this means much valuable development. Some 1,500 miners are employed in the District."

Inquire Into Smelter Charges

There is every indication that the inquiry into the schedule of charges and the general policy of the Consolidated Mining & Smelting Co. of Canada, towards the operators of British Columbia will commence at an early date. Messrs. Fowler, DeLashmut and Anderson, three prominent mining men of British Columbia, who were nominated by the Associated Boards of Trade as being the proper persons to conduct such an investigation, have decided to accept their appointment at the hands of the Dominion Government, the latter, apparently, having met their wishes in regard to empowering them to take evidence on oath and also as to providing the finances necessary to enable them to make their work thorough and complete.

Are All Coal Miners Doing Their Duty?

Coal mine operators of British Columbia have complained for some time of the tendency which they allege exists among their men of laying off at frequent intervals to enjoy a holiday notwithstanding the former's efforts to meet the urgent need for fuel by increasing the output of their mines. They assert that many of the men, all of whom now are receiving much higher wages than are available under normal conditions, take advantage of

their improved financial position to work little more than is necessary to obtain a good living remuneration.

In this connection Mr. T. A. Spruston, Superintendent of the Canadian Collieries (Dunsmuir) Ltd., has received the following communication from Mr. N. Thompson, Fuel Controller for British Columbia:

Dear Mr. Spruston:

I have to thank you for your favor of September 9, enclosing statement showing the percentage of shifts lost from the 3rd to the 7th.

I regret to see that the percentage has gone up for the time mentioned without considering the holiday of September 2, and I think it is a pity our men here cannot see the importance of working as near as possible full time and keeping the production of coal up to as near as possible the top notch.

Just recently I received a file of letters from the Fuel Administration of Washington, setting forth the extra effort that is being made by the miners in the United States since they entered into the war. I enclose herewith copies of some of the memos which I received, and it is my intention to send similar copies to the secretaries of the men's committees of the various mines in British Columbia, and I trust it may have the effect of impressing upon them the importance of their responsibility in the present crisis of our country's history.

Yours faithfully,

(Sgd.) N. THOMPSON.

Fuel Administrator for British Columbia.

The memoranda in question shows that the United States Fuel Administration has found that since coal production records began to be broken in various of the leading districts, the spirit of emulation seems to be catching throughout the entire production field. In nearly every field the mine workers are a unit in consenting to make a sacrifice of many of their usual holidays and diversions. Wherever there seems to be a danger of taking men away from the vital task of mining more coal the mine workers are doing their part by making the necessary sacrifice.

One special incident given is at Barnesboro, Pa., the centre of an important mining district, where one of the annual events enjoyed by the mine workers has been the picnic of the Northern Cambria Scottish Club. It is pointed out that word has been received by Mr. Jas. B. Neale, Director of Production, U.S. Fuel Administration, that the Northern Cambria Club has decided to discontinue its annual picnic during the period of the war so as not to interfere in any way with coal production.

It is further explained for the benefit of the Western Canadian miners that the U. S. Fuel Administration has taken the position that in producing fields wherever public gatherings, county fairs, firemen's picnics and such like, are likely to interfere with production it is desirable that they be abandoned while the present National need of fuel continues.

Coal Production.

British Columbia's production of coal for the month of August totalled 240,055 tons, which is an increase of 13,467 over July, and the highest tonnage produced in any month so far this year. Vancouver Island takes the lead in comparison with the output of other Provincial Collieries having 145,266 tons to its credit. The Crow's Nest Pass mines are next with 78,971 tons while the Nicola Princeton District shipped 15,818 tons.

Of the Island companies the Canadian Collieries Ltd., have the best showing with 71,791 tons, the Canadian Western Fuel Company following close with 61,200 tons. The balance is accounted for by the smaller collieries as follows: Pacific Coast Coal Mines, South Wellington, 6,858 tons; Nanoose Collieries, 2,631 tons; Granby Consolidated Mining & Smelting Co. (Cassidy's), 2,383 tons; B.C. Coal Co. (Jingle Pot), 400 tons.

In the Crow's Nest Pass District the Crow's Nest Pass Coal Co., produced 66,457 tons from the two collieries operated, as follows: Coal Creek Colliery, 44,366 tons; Michel Colliery, 22,091 tons; Corbin Coal & Coke Co., 12,514 tons.

The Middlesboro Collieries were the biggest producers in the Nicola Princeton District with a tonnage of 8,529, the remainder coming from the smaller collieries.

The new mines being opened on the Island are beginning to count in the monthly production, these recently opened up at South Wellington and Cassidy's having an output of 5,530 tons for the month, while it also is to be noted that the Jingle Pot, for months sealed by order of the Chief Inspector of Mines, because of fire, is again on the shipping list. But the most remarkable gain is that of the Harewood Mine of the Canadian Western Fuel Company which was recently re-opened and last month produced 21,695 tons.

At the other new mine, which is being opened by the Canadian Western Fuel Company on the farm near Nanaimo, rapid advances are being made. Two shafts are being sunk to tap the Wellington Seam, and one of these struck the coal a few days ago, exposing a seam about 9 feet in thickness. The other is expected to reach the same seam sometime during the present month.

The total production of the coal mines of British Columbia so far this year is 1,822,031 tons. For the same period last year it was 1,535,998 tons. Therefore there has been a gain of 286,033 tons.

WILL OPERATE SILVER BELL MINE.

Considerable activity is reported at the Silver Bell mine, a high grade silver-lead property situated on the South Fork of Kaslo Creek, B.C., and owned by Mr. R. F. Green, M.P., and Mr. S. Green. Quantities of equipment and supplies are being shipped in and it is understood that operations are to be carried on well into the winter. This property has been idle for fifteen years.

EXODUS OF GOLD MINERS FROM YUKON AND ALASKA

The stationary price of gold and the much increased cost of mining material, food and supplies has caused a sudden exodus of miners and their families from the Yukon and Alaska. Every boat coming down the coast from Ruby, Fairbanks, Iditarod and Dawson comes with all accommodation taken by people who are leaving the country for the coast, where there is hope of getting work in shipyards and other war industries at high wages until after the war. This "stampede," for it is said no other term fittingly described the condition, has caused a decided slump in the gold output, as evidenced by figures tabulated by the banks, express companies and others. The decline in the Alaskan camps is said to be fully 50 per cent., according to figures given out by various institutions having to do with the handling of bullion. The Yukon and Alaskan Press is unanimous in declaring that unless a bonus is provided or other adequate measures taken the gold camps of the North will be paralyzed until normal conditions are restored. Arrivals at Dawson express doubt as to whether all those who want to get out of the country this winter will be able to do so. There is an agitation to request the Government to send extra boats to help those having difficulty in getting out of the district. The overland stages are crowded.

Mr. Hugh Boyle, of the Dominion Diamond Drill Co., has gone to Weyburn, Sask., to superintend some extensive diamond drilling work in the coal fields there.

Granby, Oct. 8.—At first glance the report of the Granby Consolidated Mining Company for the year ended June 30th last, presents a rather lean showing. Granby, however, like most mining companies, increased its chargeoffs last year, pulling net down to but a few cents above the annual dividends of \$10 a share.

On a production of 44,675,000 pounds of copper and 550,000 ounces of silver the company earned a gross operating profit of \$4,124,819. After bond interest of \$582,195, net profits were \$3,542,624, or the equivalent before depreciation of \$23.60 a share on the 150,000 shares.

But Granby reserved for depreciation \$2,015,491, 60 per cent. more than the \$1,256,267 set aside in the preceding twelve month, a sum that would seem to be ultra-conservative. After this reservation there remained a balance of \$1,527,133. The year's dividend called for \$1,500,000, leaving a surplus of but \$27,133.

With \$2,015,000 charged against earnings for depreciation stockholders need have nothing to worry about, for Granby can easily earn and pay \$10 a share with copper at or near 26 cents a pound.

"Mine exhaustion" has caused a writing down of value of mining property to \$9,100,000 from \$15,000,000 at which it had stood for a number of years.

Ore reserves on June 30th were placed at 23,531,208 tons, estimated contents being 688,064,015 pounds of copper, 265,157 ounces of gold, and 2,238,193 ounces of silver. This tonnage includes 10,000,000 of low-grade material which the company hopes to handle by flotation.

NORTHERN ONTARIO

Hollinger-Consolidated Mining Company.

Operating their milling plant at a little more than half capacity, the Hollinger-Consolidated Mining Company at Porcupine is yielding well over \$500,000 in gold per month. Recently the directors of the company visited the property, and on their return to Montreal expressed themselves as "more than ever impressed with the greatness of the mine." It was also stated to be the intention of the directors to keep the mine in continuous operation as long as the supply of labor will permit. At the present time the supply of workmen is far from satisfactory and efficiency is sadly lacking, but in spite of this fact the production of the company remains high. With a sufficient number of men available the present equipment of the Hollinger-Consolidated could be speeded up to from 3,000 to 3,500 tons daily, compared with less than half that amount being treated at the present time. owing to the fact that the winter months usually see an increase in the number of men at the various properties, seeking employment removed from contact with nature's elements encountered in outside work, the next six months' operation of the property may reasonably be attended with great prosperity. Added strength is given to this contention when it is remembered that the Canadian Government may follow the example of aiding the gold mining industry by placing miners in preferred classes in respect to the need of men for military drafts, and it is highly probable that special concessions will be given to these concerns in the matter of taxation. It is understood that the Hollinger, due to having increased its average mill heads, is making net profits considerably in excess of dividend requirements of 1 per cent. every eight weeks, or $6\frac{1}{2}$ per cent. per annum, the policy of the directors being to further add to the already big surplus. The dividends at $6\frac{1}{2}$ per cent. are on a parity with the returns of first-class bonds; with the added inducement that with the conclusion of the war and adequate working forces, the company will be able to pay 13 per cent. or even more. The company own a large area of ground which up until the present time has been proven to contain upwards of two score veins, none of which have been explored, while

depth of 1,200 feet upwards of \$40,000,000 in ore reserves was shown in the last annual report of the company. To use the words of one of the directors who recently visited the property: "The Hollinger has only started to mine."

A limited amount of development work is being done at the Dome Mines, Porcupine, and about sixty men are employed at the property. It is understood a contract for driving a raise from the 800-foot to the 700-foot level was recently let. Heretofore the main workings of the Dome have been between the 700-foot level and the surface, where, according to the last annual report of the company, close to \$10,000,000 in gold ore was blocked out. The present plan would appear to be to add the 800-foot level to the main workings of the property. With exploration work having been carried to a depth of 1,250-feet, where considerable lateral work was done, it appears reasonable to expect that the various levels down to that depth will be developed in their turn as fast as labor conditions will permit. With a return to normal conditions the Dome Mines should be one of the first and foremost properties in the Porcupine camp to reflect the improved conditions.

Very satisfactory results are obtaining in a winze driven from the 1,000-foot level of the McIntyre-Porcupine Mines. It will be remembered that upwards of a year ago diamond drilling disclosed the presence of an ore body at a depth of 1,400-feet, which proved to be the downward continuation of the main ore body of the mine. The policy of development being followed by the McIntyre is to establish main haulage levels at depths of 300-feet with intermediate level at depths of 150-feet. Thus the 1,300-foot level will become a main haulage way with an intermediate working at the 150-foot level. This will permit of the automatic handling of ore from the stopes of the mine to chutes where it will be possible to load the cars with the minimum amount of labor. The production at this, the second largest producer in the Dominion of Canada, is at the rate of upwards of \$150,000 per month. The mine is now developed to a position where added milling facilities are required and with a cessation of hostilities in Europe and a sufficient supply of men, it is understood the company would immediately undertake the construction of an addition to the mill which would raise the present capacity of 600-tons per day to 1,000-tons. The average gold content in the ore of the mine, as so far determined appears to be close to \$11 per ton. In the past it has been the policy of the management to treat the ore from development work without bringing it up to the average of the mine. This policy has resulted in placing the ore reserves in excellent condition. The annual meeting of the company has been called for the 26th of the present month and besides the general business of the organization, the shareholders will vote on the proposed purchase of the Plenaureum property. The forthcoming annual report will cover the period of operations for the fiscal year of the company ending on June 30th last, and is expected to show the affairs of the company to be in an exceptionally satisfactory condition.

The new shaft being sunk at the Davidson property is down nearly 400-feet, this shaft is being sunk some distance north of the original shaft. The object in view in sinking this shaft is to open up an ore body which has been cut by diamond drilling at depths of 650 and 550-feet. The core of the first drill hole showed a vein 30 feet in width of ore containing good average milling values, while the second hole disclosed the ore body a similar width with slightly increased value a hundred feet lower down. The shaft is being sunk at the rate of about five feet per day and should encounter the new ore body within

tensive ore body has been opened up down to the 300-foot level, ore from these workings having been treated in the mill since the commencement of milling operations.

Mr. P. A. Robbins, managing director of the Hollinger-Consolidated Gold Mines, has joined the forces of the American Engineers for overseas service, and left recently for California, where his family will reside until his return from overseas. Mr. Robbins was general manager of the Hollinger all through its early development, and indeed, up until seven months ago, at which time he became managing director, to be succeeded by Mr. Brigham as general manager. To the former general manager is due in a large measure the present satisfactory condition of the Hollinger-Consolidated. Besides his extensive mining activities, Mr. Robbins found much time to devote to municipal affairs in the town of Timmins and will be greatly missed in this respect as well as by Northern Ontario mining men generally.

A carload of concentrates resulting from the operation of the new Peterson Lake Mill was among the list of shipments from the Cobalt camp for the past week, the material going to the Globe smelter at Denver, Colorado. Mr. C. A. Filteau, manager of the National Mines, was appointed manager of the Peterson Lake Silver Mining Company at a meeting of the directors held on the 14th of September. Mr. Filteau will also continue to manage the National property. Both these properties are equipped with small oil flotation plants, and are treating tailings from previous operations.

The annual meeting of the shareholders of the McIntyre Porcupine Mines, Limited, will be held in the Board Room of the Bank of Hamilton, 65 Yonge Street, Toronto, on Saturday, the 26th of October, 1918, at eleven o'clock in the forenoon for the purpose of receiving the report of the operations for the year ended June 30th, 1918; for the election of directors for the ensuing year, and the transaction of such other business as may properly come before an annual general meeting of shareholders and for the following special business: To consider and, if approved, to ratify and confirm a by-law of the company authorizing it to purchase the whole or any portion of the capital stock of the Plenaureum Gold Mines, Limited, for cash or fully paid stock, and to use the funds of the company therefor.

The installation of machinery at the Haileybury Mining School is nearing completion. The building itself was completed some time ago. The structure is of solid brick. The ground floor is almost wholly taken up with a complete mill of the most modern design. In addition to serving educational purposes, the mill is expected to be useful in determining the process best suited to the treatment of the various ores met with throughout this mining district. The equipment consists of a small jaw crusher, three light stamps, amalgamation plate, classifiers, 3 x 4 tube mill, concentrating tables, the usual agitators and thickeners. Flotation equipment has also been installed. Therefore it will be possible to test ores for determining either their free-milling qualities, their adaptability to cyanidation, or treatment by flotation.

The record from the Coniagas Mine at Cobalt for the current year promises to be on a par with that of last year, production being at the rate of upwards of one million ounces of silver annually. According to the last annual report the company had approximately five million ounces of silver in their ore reserves. Last year the price of silver averaged 81.47 cents per ounce, while for the first half of the current year the price of the white metal has averaged 92.8 cents per ounce. Owing to arrangements between the governments of Great Britain and the

United States in which the price was fixed at \$1.01½ cents per ounce, the average price for the full calendar year will be 96.805 cents per ounce. This is more than 15 cents per ounce over the average price for the preceding year. The increased net earnings for the various large silver producers is readily realized.

This week in the crosscut being driven west at the 310-foot level of the Adanac Silver Mine, which adjoins the Temiskaming, ore was encountered. The new vein is upwards of six inches in width and is composed of calcite, cobalt and niccolite, as well as considerable native silver. This vein was encountered approximately twenty-one feet west of the first stringer cut in this cross-cut, which marked the eastern side of a series of veins, which bid fair to develop into a big asset for the Adanac Company. For the full twenty-four feet the cross-cut has opened up a series of veins, ranging in width from mere stringers to as much as nine inches, the last few veins encountered being the strongest and most uniform of the series. When the entire shear zone has been cross-cut the management will commence drifting on the most encouraging vein, and the results are looked forward to with the keenest interest. With such a series of veins occurring in the Keewatin formation in the zone immediately above the diabase and in close proximity to one of the most pronounced shearings in the mine, the outlook never appeared so bright for the Adanac. The geological conditions being met with are proving true to those predicted by Mr. A. R. Whitman, well-known geologist, and the conditions are almost identical with those prevailing on the Temiskaming mine in its most productive areas. The Adanac will be the centre of interest in the Cobalt camp until the importance of the new discoveries is determined.

Active underground operation of the Foster mine at Cobalt has commenced, the property being under lease to Messrs. C. L. Campbell, of Montreal, and Mr. W. Fairburn, the latter being in charge of the work at the mine. A small railway siding has been constructed from the Nipissing Central Railway to the property and the dumps from previous operations are being transported to the Northern Customs mill at 104 for treatment. Already upwards of ten cars have been shipped, the ore for the greater part being of low grade, running approximately ten ounces to the ton. With the cost of mining eliminated this allows of a good margin of profit with silver selling above the dollar mark. A considerable amount of high grade ore is also being encountered in the work of loading the ore. This is being sorted out and bagged and a considerable amount running close to 2,000 ounces to the ton has already been found. It is estimated that the entire dumps contain about 13,000 tons. The mining operations underground, for the time being, will be confined to the upper levels owing to the fact that the lower levels of the property are flooded with water and considerable delay will follow before the de-watering can be accomplished. The agreement on which the lease has been given to the present operators calls for ten per cent. of the profits to go to the Foster Mining Company. Facilities for handling the ore from the mine and dump are being improved and it is expected that in the near future about one car of ore per day containing upwards of fifty tons will be sent to the mill for treatment.

Developments at the Beaver Consolidated property at Cobalt in the zone immediately above the diabase are understood to be very favorable. At the same time the new mill on the company's Kirkland Lake property, the Kirkland Lake Gold, is nearing completion, with the resultant possibility of adding largely to their revenue from the treatment of the large amount of good grade ore

already mined and on the dumps at this property ready for treatment in the new mill, as well as the workings of the property having reached the most advanced depth in the Kirkland Lake camp (700-feet) at which point the vein was proven to contain consistent width and value over some 20-feet. A new main shaft is being sunk as a central working for the property and is being connected with the old underground workings as each succeeding level is reached. It might be said that the Beaver Consolidated is in a very strong physical position.

Development work at the Keeley mine is being carried on in a small way, a few men being employed by the company and considering the size of the working force a considerable amount of ore is being recovered. Owing to the fact that the personnel of the company is made up of Old Countrymen, it is not thought likely the property will be very aggressively operated until the conclusion of hostilities in Europe.

The legal action involving the interlocking directorates of the R. A. P. Syndicate property and that of the Boston Creek Gold Mines is reported to have been settled out of court. It is further learned from a reliable source that negotiations aiming at the amalgamation of the two properties are now in a more or less advanced stage. The rumors to the effect that operations would be resumed in the near future appear to be well founded. The R. A. P. property is equipped with a modern mining plant while the Boston Creek Gold mines have buildings sufficiently large to accommodate an adequate working force. Prior to the development of differences between the principals of the companies, the R. A. P. Syndicate shaft had been driven to a depth of 200-feet, at which point lateral work was carried on to the property of the Boston Creek Mines, on which a winze was driven to a depth of 300-feet. With a merger of the two properties effected their development could be carried forward without much delay. News to this effect will cause general satisfaction in the Boston Creek camp and at the same time extend the field of active operations.

MARKETS

STANDARD MINING EXCHANGE.

Closing prices October 7th, 1918.

Silver.	Bid.	Asked.
Adanac Silver M., Ltd. ....	.11 $\frac{1}{4}$	.11
Bailey .....	.04 $\frac{3}{4}$	.04 $\frac{1}{2}$
Beaver .....	.31	.30
Chambers Ferland .....	.10 $\frac{1}{2}$	.09 $\frac{1}{2}$

Coniagas .....	..	2.50
Crown Reserve .....	.22	.19
Foster .....	.02 $\frac{1}{4}$	..
Gifford .....	.02 $\frac{3}{4}$	.02 $\frac{1}{2}$
Great Northern .....	.04 $\frac{3}{4}$	.03 $\frac{3}{4}$
Hargraves .....	.03	.02 $\frac{3}{8}$
Hudson Bay	18.00	..
La Rose .....	.52	.50 $\frac{1}{2}$
Lorrain Con. M., Ltd. ....	.02	.01
McKin-Dar-Sav. ....	.42	.41
Mining Corp. of Can.	2.75	2.38
Nipissing	8.80	8.55
Ophir .....	.05 $\frac{3}{4}$	.05 $\frac{5}{8}$
Peterson Lake .....	.10 $\frac{1}{2}$	.10
Right of Way .....	.04	.03 $\frac{3}{4}$
Silver Leaf .....	.00 $\frac{3}{4}$	.00 $\frac{1}{2}$
Temiskaming .....	.40 $\frac{1}{2}$	.30
Trethewey .....	.25	.23
Wettlaufer .....	..	.04 $\frac{1}{2}$
York, Ont. ....	.01	.00 $\frac{3}{4}$

Gold.	Bid.	Asked.
Apex .....	.03	.02 $\frac{3}{4}$
Boston Creek Mines .....	.29	.25
Davidson Gold Mines .....	.35	.30
Dome Extension .....	.18 $\frac{1}{4}$	.17 $\frac{1}{2}$
Dome Lake .....	..	.10
Dome Mines	10.50	10.10
Eldorado .....	.02	.00 $\frac{1}{2}$
Elliott-Kirkland .....	.36	..
Hattie Gold Mines .....	.69	..
Hollinger Cons.	5.15	5.10
Keora .....	.10	.05 $\frac{1}{2}$
Kirkland Lake .....	.40	.38
Lake Shore M., Ltd. ....	.74	..
McIntyre	1.51	1.50
Moneta .....	.07 $\frac{1}{2}$	.07
Newray Mines, Ltd. ....	.17	.12
Porc. Crown .....	.16	.15 $\frac{1}{2}$
Proc. Imperial .....	.01 $\frac{1}{4}$	.01
Porc. Tisdale .....	.01 $\frac{1}{4}$	..
Vipond .....	.18	.16
Preston East Dome .....	.03 $\frac{1}{4}$	.02 $\frac{3}{4}$
Schumacher .....	.20	.19
Teck-Hughes .....	.25	.23 $\frac{1}{2}$
Por. V. N. T. Gold M. ....	.18	.15 $\frac{1}{2}$
Thompson-Krist .....	.05 $\frac{1}{4}$	.04 $\frac{3}{4}$
West Dome .....	.11 $\frac{1}{2}$	.11
Wasapika Gold M., L.25
Miscellaneous.	Bid.	Asked.
Vacuum Gas08	.06 $\frac{1}{2}$
Rockwood Oil & Gas25	.24

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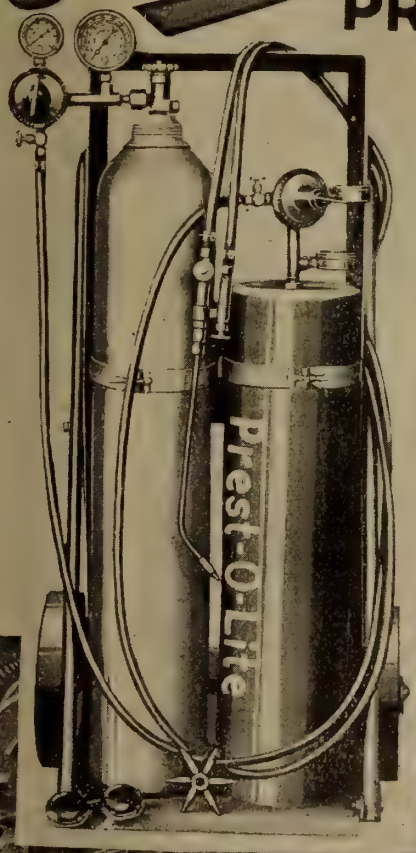
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The Canadian Northern Railway in Manitoba gives access to the Pas Mineral Area. In Alberta the Canadian Northern is serving important coal fields.

THE DEPARTMENT OF RESOURCES CANADIAN NORTHERN RAILWAY

The Department of Resources, Canadian Northern Railway Building, Toronto, will be pleased to furnish information about the districts served.

Dr. Charles F. Mabery said, in the *Journal of Industrial and Engineering Chemistry*:

"In the general plan and scope of this work it seems difficult to suggest an improvement. The evident care in its preparation, the statements supported by numerous citations from petroleum literature, and the cooperation of practical experts, are the best assurance of its accuracy."

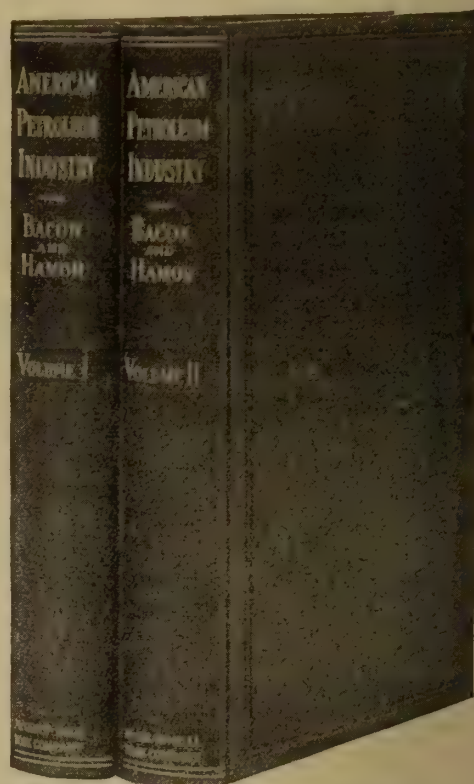
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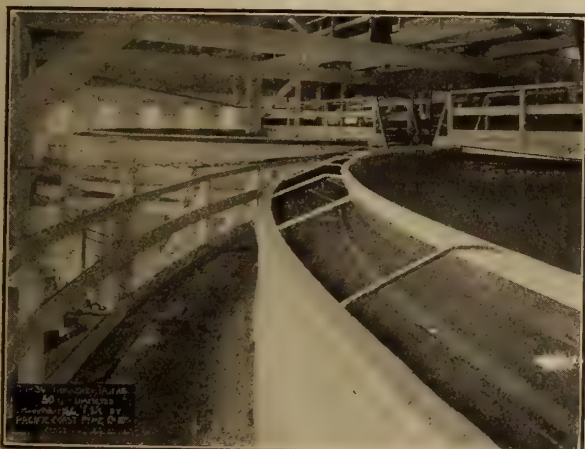
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Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duhcan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke.

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway.—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

To Users of the Callow Pneumatic Flotation Cell

THE recent decision in the Butte & Superior Suit with Minerals Separation has an important bearing upon the use of the Pneumatic, or Callow method of flotation.

The Appellate Court's decision at Philadelphia, in the Miami case, had already made clear the distinction between (1) froth produced by violent mechanical agitation of the Minerals Separation process, and (2) simple levitation by air bubbles, as practised in the Callow or pneumatic cell, without such agitation.

Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

Both the use (1) of oil in excess of ten pounds (0.5%) in combination with violent agitation, and (2) the use of the Callow system of aeration with any quantity of oil, appear therefore to be immune from any charge of infringement.

(Signed) J. M. CALLOW

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TORONTO

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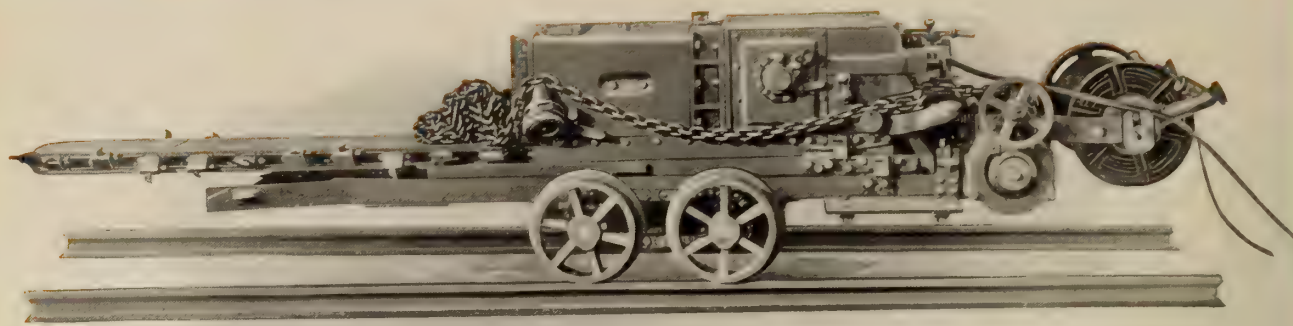
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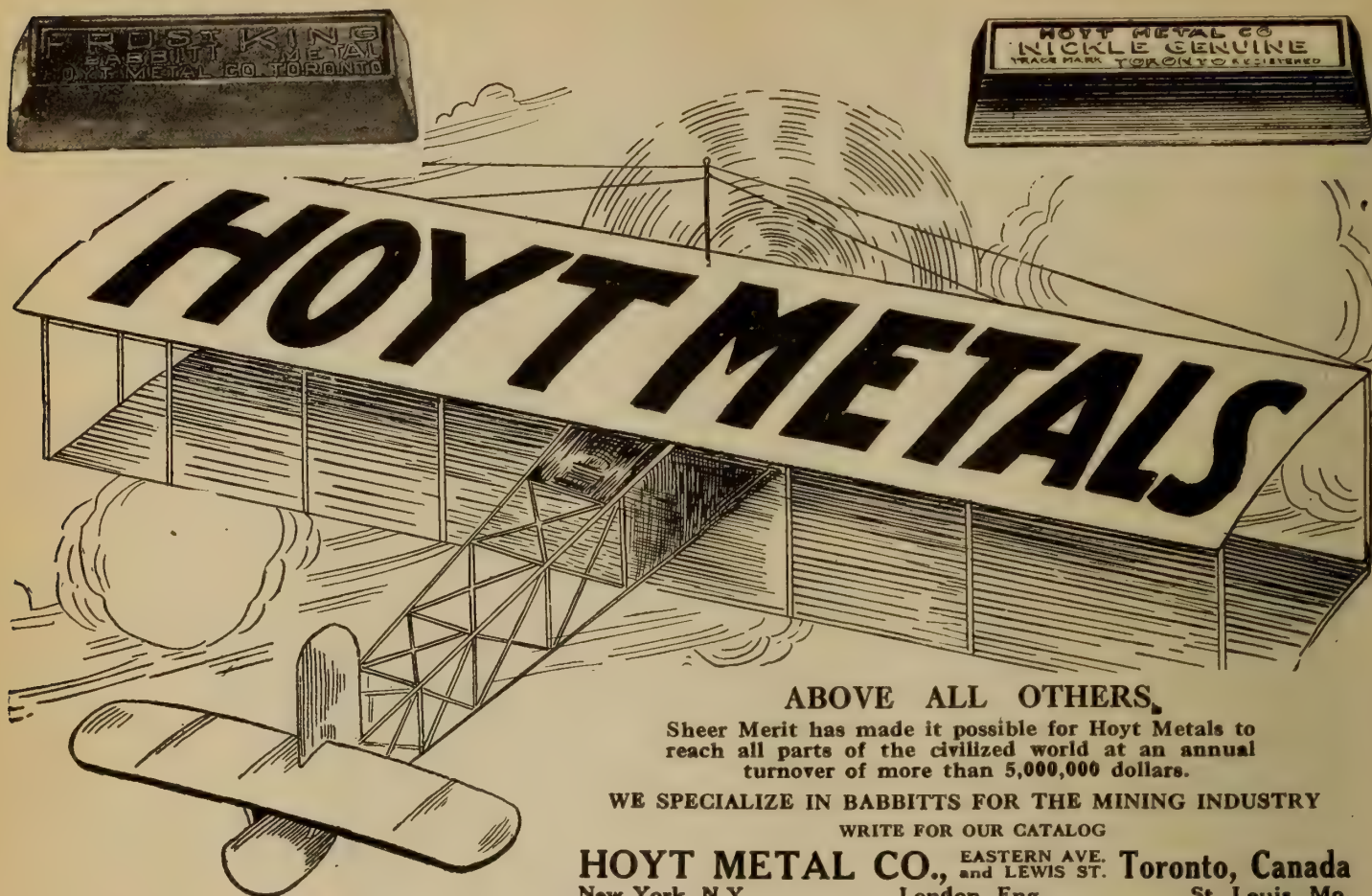
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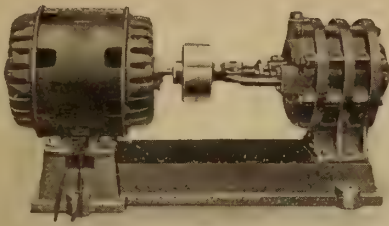


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MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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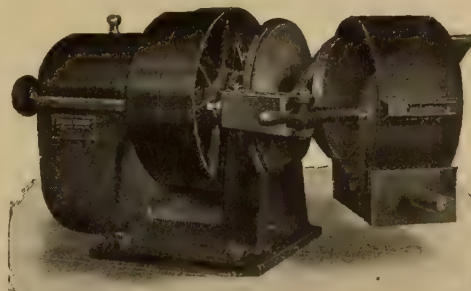
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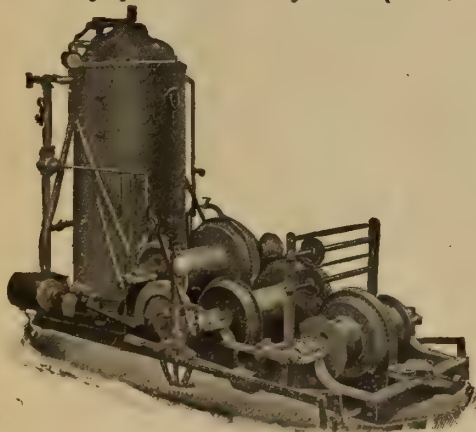
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N INTERNATIONAL MINING CONVENTION AT VANCOUVER.

An international mining convention will be held at Vancouver, B.C., from the 8th to the 10th of January, 1919, inclusive. It will be conducted under the auspices of the Vancouver Chamber of Mines, the officials of which body propose bringing some of the most prominent mining men of the continent to this Province to participate in the proceedings. They take the position that British Columbia's possibilities as a mining centre are just beginning to be realized; that its future in this respect has been to some extent forecast by what has been done in supplying metals necessary in the manufacture of munitions; that the outlook has been further brightened by the discovery and the development to some extent of molybdenite and manganese, to say nothing of platinum; and that its mineral resources have as yet not been exploited in any marked degree. As its history as a mineral producing country has yet to be written, they think both its citizens and the outside world should be brought to more fully realize its riches in this respect and that one of the best means is through a convention of the representative character contemplated and the arrangement of a programme which will be both entertaining and educative.

ENGINEERS AND THE MINING INDUSTRY

In the October Bulletin of the Canadian Mining Institute reference is made to the relations with the Engineering Institute of Canada, the society formerly known as the Canadian Society of Civil Engineers. The secretary urges on members the desirability of consolidating to protect the engineering professions and promises to the Engineering Institute the co-operation of the Mining Institute whenever it may be requested.

To protect the interests of its members is one of the proper functions of any society. Another proper function is to co-operate with other societies on matters of common interest. Obviously, therefore, it is to be expected that there should be co-operation between the Mining Institute and the Engineering Institute on matters affecting the status of the engineering profession. We have no doubt that there will be.

It is a mistake, however, to expect that there will not be differences between these two Institutes. The aims of the two are similar in some respects; but quite different in others. Failure to recognize the points of similarity and difference has been responsible for some unpleasantities in the past. Would it not be well for each Institute to undertake to make the members of the other more familiar with the nature of the respective societies?

To us the essential difference between the Institutes is that one represents an industry, and the other represents a profession.

The Canadian Mining Institute is chiefly composed of technical men. This is a natural consequence of the fact that mining and metallurgical operations are to a very large extent directed by, and carried on with the assistance of technical men. It does not follow, however, that the Mining Institute is a mere technical society. We would be very sorry if it should become such. The aim of the Mining Institute is to develop the mineral resources of Canada. Among its members are several who have had no technical education; but have other qualifications which make them equally valuable as members. They would not qualify, and would have no particular desire to belong to, an engineering society; but they are eminently qualified to take a leading part in the mining and metallurgical industries.

The Engineering Institute of Canada, on the other hand, represents no particular industry. It has, nevertheless, good and sufficient reasons for existence. Comparatively few mining engineers belong to the Engineering Institute because the Mining Institute gives them the advantages of a professional society while it also represents their industry. The professional members of the Canadian Mining Institute will always be found ready to co-operate with the members of the Engineering Institute in efforts to improve the status of the engineering profession.

ALBERTA COAL MINES WILL PRODUCE 6,000,000 TONS THIS YEAR.

J. T. Stirling, Chief Inspector of Mines for the Province of Alberta, who also is the Chairman of the Workmen's Compensation Board of that Province, has just returned after making a stay of some weeks in British Columbia. During this period Mr. Stirling visited some of the coal mining districts with a view to acquainting himself with conditions and also gave some attention to the provisions of the Coal Mines Regulation Act under which the British Columbia mines are operated. He states that in Alberta coal mining never has shown such activity before. The output this year he believes will reach the total of 6,000,000 tons as compared with 4,000,000 tons for 1917. From the Drumheller District alone, which has been opened up for a comparatively short time, there will be a product aggregating at least 1,000,000 tons. New mines are being developed in many sections of the Province and are shipping, many of them, on a small scale.

PRODUCTION OF COAL IN BRITISH COLUMBIA.

In view of the discussion as to the production of British Columbia's coal fields this year, and the possibility of the output meeting at least the most pressing demands both domestic and foreign it is interesting to give the results of a rough estimate made by a high authority. Up to the end of the month of August the production was 1,821,681 tons, and an estimate of the output of the month of September, the returns being not yet available, is 167,301 tons, making a total of 1,988,982 tons up to the last day of last month. From this must be taken 221,840 tons which was used in the making of coke. The total coal marketed from this Province for the first three-quarters of the year, therefore, would be 1,767,142. At the conservative valuation of \$5.50 a ton, this would be \$9,719,281. In this period it is estimated that the Crow's Nest Pass collieries had produced 130,389 and the Canadian Collieries (D) Ltd., 19,196 tons of coke, a total of 149,585, which at a valuation of \$9 a ton, equals \$1,306,265. So the value of the coal production of British Columbia may be said to aggregate approximately \$11,025,546.

COAL MINERS ACCEPT ORDER OF DIRECTOR OF COAL OPERATIONS.

The coal miners strike in the Crow's Nest Pass District is at an end. After being out since the 4th of September, the men went back to work on the 8th of October, having accepted the order of Mr. W. H. Armstrong, Director of Coal Operations. This grants them their demand for a single shift system in the operation of the mines of Fernie and Michel and provides that Mr. Armstrong will request of the Provincial Mines Department that a Royal Commission be appointed to investigate the condition of the mines in question, presumably to establish whether or not the one shift in twenty-four hours is necessary for the protection of the lives of the underground workers.

It is reported that a deal is pending whereby the manganese deposits of the Cowichan Lake District, Vancouver Island, will be put to industrial uses by Vancouver interests. At present the properties are controlled by Mr. C. H. Dickie, of Duncans, V.I.

There is another Yukon and Alaska "stampede" in progress, but in the opposite direction to that of years ago. The generally unprofitable character of gold-mining to-day is felt in the far north, to even a greater extent to elsewhere. There is much talk of government assistance, but apparently little faith that it will be forthcoming.

THE ALLIED METALS CONGRESS.

The Allied Metals Congress at Milwaukee, held October 7th-11th, under the joint auspices of the American Institute of Mining Engineers, the American Foundrymen's Association and the American Malleable Castings Association, was one of unusual importance. Its purpose was to assist in carrying on the war and those who organized the Congress and all who contributed to make it a success have good reason to believe that their efforts will have good results. Many valuable papers were presented and discussed and a splendid exhibit of labor saving machinery was made. Those attending must have profited by the many practical suggestions offered and been stimulated to greater effort by the earnestness of purpose of their fellows. Men who are responsible for the production and manufacture of metals have seldom gathered in such numbers anywhere in America, certainly never with such a serious common object. Not under any ordinary circumstances will one see eight hundred foundrymen listening with rapt attention to technical descriptions of processes of manufacturing cast iron.

Headquarters for the Congress was at the Milwaukee Auditorium. This splendid building is exceptionally well adapted for both exhibitors and meetings. The 165 exhibitors had space in the Arena and Machinery Hall. In the Arena were displayed manufactured products, tools, shop supplies and accessories. In the Arena foundry and metal working equipment was shown in operation. Large and small lecture halls were utilized for the meetings.

Opportunity was given to visit many of the notable plants in Milwaukee and vicinity. A plant visitation schedule was arranged and private cars took the guests to the plants of the Allis-Chalmers Mfg. Co., Kearney & Trecker Co., Falk Co., Chicago & Milwaukee Ry. Co., Wisconsin Gun Co., Sivyer Steel Casting Co., Pawling & Harnishfeger Co., Northwestern Malleable Iron Co., Vilter Mfg. Co., and the Filer & Stowell Co. The great shops of the Allis-Chalmers Co., the Falk Foundry and the Wisconsin Gun Co., where 75 mm. guns are being made, proved particularly interesting to many of the guests.

At the opening session Hon. E. L. Phillipp, Governor of Wisconsin, welcomed the guests. He dwelt on the need of materials for carrying on the war, and asked those present to proceed with their plans for increasing production regardless of rumors of peace. He believed that the end of the war is drawing near, but he thought it very important that there should be no halt in production until peace is an accomplished fact. He ventured the opinion that when peace does come there will be a tremendous demand for materials for reconstruction. Mr. B. D. Fuller president of the American Foundrymen's Association assured him that the foundrymen would not allow peace talk to interfere with their efforts. He congratulated Milwaukee on its war effort.

Mr. E. D. Brigham, manager of the iron ore, coal and grain traffic of the United States railroad administration asked for the co-operation of the metal trade in meeting the demands made on transportation. He said that everything must be subordinated to the demands of the government and that producers must look with patience on shortage of shipping facilities.

Mr. C. S. Koch, of the Ordnance Department, Washington, gave some account of the activities of the Army Ordnance Department, with especial reference to foundry matters. Major Frank B. Gilbreth gave an illustrated talk on military matters of special interest to metal workers.

It was decided that a message should be sent to President Wilson assuring him that the metal industry would

leave nothing undone to accelerate the production of munitions. The following resolution was passed.

"That every resource of these allied metal trades is again pledged to the government not only in the production of materials for the conduct of the war, but for the accelerated manufacture of these materials to enable the government to greatly intensify its prosecution of the war, and to bring about a speedy and crushing defeat of the enemy that will lead to his abject and unconditional surrender."

While the Congress was in session a message was received from Chairman Hurley of the United States shipping board who urged manufacturers to increase their export trade. He said that the U. S. Government was turning out many ships that would be of little use after the war unless manufacturers took advantage of the favorable opportunity for increased export of goods. Chairman Hurley asked for committees to investigate the situation.

One of the notable features of the Congress was the session devoted to manufacture of semi-steel. The opinion was expressed on all sides that semi-steel shells will soon be manufactured in very large quantities in the United States, as they have been in France. In view of this fact the manufacturers who have facilities for undertaking the work took a very keen interest in whatever information was obtainable at the sessions.

The chairman, Mr. John A. Penton opened the session by a short address in which he pointed out that it was expected that many of those present would be called upon to make semi-steel shells. He asked them to follow carefully what was said concerning the manufacture, and to consider whether they could undertake such work. He believed that many plants would be found suitable for the manufacture of such shells. The chairman then introduced three French Army officers, members of the Commission now in Washington.

The experience of the French manufacturers of semi-steel was outlined by Lieut. Laurent. He stated that some semi-steel shells had been made before the war and the invasion of Northern France had made it imperative that a substitute for steel be found. The French Ordnance Department found this substitute in cast iron of the variety known as semi-steel.

The ordinary cast iron shell had not sufficient strength and gave on explosion a comparatively small number of effective fragments. When steel scrap is added to the iron, however, a low carbon iron is obtained. It was found that about 30 per cent. steel gave a very suitable mixture.

The advantages of semi-steel over steel are many. In the first place there is not sufficient steel available to meet the requirements and the use of semi-steel would effect a great saving as it did in France. Then, instead of a few steel working plants it is possible to utilize almost any well equipped foundry to make shells. As foundries are scattered over the country the labor problem is also simplified. The materials used are not only more abundant, but less expensive. Scrap steel and rejected semi-steel will supply a large part of the steel needing in the mixture.

The physical requirements and chemical characteristics were detailed by Lieut. Laurent. He indicated how test bars were taken in French practice and gave the figures for tensile strength, elastic limit, crushing strength. The iron contains 2.75 to 3.25 per cent. carbon. It seems essential that the amount of combined carbon should not be over 20 per cent. of the total carbon. To keep combined carbon low, silica may be used, but the amount must not be large. A good rule is that total carbon plus silicon shall be less than 4.5 per cent. For instance, if total carbon is 2.75 per cent. then silicon should be less than 1.75 per cent.

The effect of manganese, phosphorus, and sulphur were pointed out. In general the action of manganese

is opposed to that of silicon. The amount of manganese that may be used is small. It has been found that difficulties arise in machining the castings if the manganese content is over 1.1 per cent.

In France it is considered good practice to avoid having more than 0.30 per cent. of phosphorus in the iron. From 0.15 to 0.30 per cent. phosphorus is permissible. Capt. Guillemain remarked, however, that in England and in the United States good results seem to have been obtained with iron containing more phosphorus or manganese than is considered good practice in France.

Sulphur seems to have no very harmful effects when present in moderate amounts. It is, however, desirable to eliminate the sulphur because it makes the molten metal less fluid. From 0.12 to 0.15 per cent. sulphur may be present in good castings.

According to Lieut. Laurent about 25,000 semi-steel shells are being manufactured every day in France. They are not as good as the steel shells; but they can be obtained in larger quantities and ordinary foundries can be utilized to great advantage.

C. E. WATSON AND G. O. RANDOLPH LOST AT SEA.

News has just been received of the loss of Chas. E. Watson and George O. Randolph of Cobalt on the "Princess Sophia," shipwrecked on the Alaska coast. Mr. Watson was manager of the Mining Corporation of Canada. Mr. Randolph was assisting him in examining western properties for the Corporation.

IRON ORE IN CRANBROOK DISTRICT, B.C.

Increased interest is noticeable in the iron ore properties of British Columbia, Mr. W. S. Bell announces he is negotiating for the sale of the two red hematite bodies in the Cranbrook District, one of them being on Sand Creek, and the other on Bull River.

Mr. Bell claims these two bodies of ore to be the only known deposits of red hematite west of the Great Lakes, and states the work already done has disclosed a tonnage of almost one million.

One orebody is within four miles of the Crow's Nest branch of the C.P.R., and the second, within nine miles of the same railroad, and therefore within a very short distance of an ample coal supply, with the consequent advantage for locating a smelter in the vicinity.

SHIPPING BOG IRON ORE FROM MONS, B.C.

Shipments of bog iron ore (brown hematite), from the properties owned and operated by Dr. J. G. Davidson and Mr. J. H. Thompson, situated two miles from Mons, B.C., on the P.G.E. Railway, started October 7th. The smelter at Irondale, Wash., has contracted for five thousand tons of this ore, one hundred and sixty tons leaving the mine daily.

Mr. Thompson has been responsible for most of the development on the properties, which were originally staked by Mr. W. J. McClure in April, 1910, and include eight claims, i.e., Iron King, Iron King Fraction, Vulcan number one and two, Summit, Morning Star, Cougar and Empress. Test holes made over the entire property indicate an average depth of from five to six feet, with occasional extreme of eight feet. Several engineers who have examined the property estimate over one million tons of ore in sight.

Typical assays made by the smelting company are appended:

Iron.....	49.47	53.37	58.49
Silica.....	4.15	2.75	2.29
Phos.....	0.068	0.184	.072
Sulphur.....	Nil	0.086	.093
Moisture.....	2.27	1.82	1.63
Ignition Loss.....	25.59	20.80	12.18

Discoveries and Developments in Northern Manitoba

By J. A. CAMPBELL.

Notwithstanding the dearth of men in Northern Manitoba, brought about by military requirements, a certain amount of prospecting has been done this year, and some promising discoveries have resulted.

Lake Athapapuskow—On the border of Lake Athapapuskow several finds have been made which are attracting wide attention. Two of these, made by William Kerr and Fred Vedo respectively, are at the North East arm of the lake almost opposite Goose Creek. They were located early in the season, are in close proximity to each other, and have common characteristics. In each case several claims have been staked and other local mining men are interested with the discoverers. Some stripping and trenching has already been done and several pits sunk. Samples taken from these show chalcopryite and bernite and assays, of which a number have been obtained, indicate that the copper content is from 3 to 4 per cent.

In this immediate district representatives of the Consolidated Mining and Smelting Company of British Columbia, owners of the Trail Smelter have staked several claims. Mr. Gram, an official of the company, spent some time in that country recently. The main characteristics of these claims are similar to those above mentioned.

Farther east, at the extreme end of the lake, is a still more recent discovery made by Jacob Cook, an Indian prospector working for J. B. Cameron and associates. A small camp has been established there and commendable energy shown in investigating the nature and extent of the ore body. Some splendid specimens of chalcopryite and bernite have been taken from this property and assays run quite high. As a result the owners are quite satisfied with the prospects and are endeavoring to make arrangements for diamond drilling the property. If this approximates in extent in any way the Flin Flon property, it will be in the front rank as a producer.

The Pine Root-Chica Claim; Phantom Lake.

Near the mouth of the Pine Root River is situated the Chica claim, one of the earliest discoveries in the district. This was taken over by a syndicate of Duluth mining men of whom Mr. E. A. Separk is the president. Mr. Separk personally inspected the property and has been over a considerable portion of the district. An item of interest that is not generally known is that a diamond drill has been working on this property all summer, and approximately two thousand feet of drilling has resulted. The work is in charge of Mr. W. J. Rashleigh and he and certain other members of the crew are also personally interested in the claim. This work is now being wound up for the season. As is usual in matters of this kind no information has been given out as to the character of the

core. It is a fair inference, however, that results have been reasonably satisfactory as it is the intention to continue the drilling next year. In addition to copper, the assays show gold and silver.

At Phantom Lake, a short distance west of the Mandy mine, Gus Rosen is doing work on claims located by him, and in which some residents of The Pas are interested. These show a variety of minerals, iron and copper sulphide and molybdenite, while assays have also revealed the existence of nickel.

Flin Flon.—Flin Flon camp is temporarily deserted; two years of diamond drilling have proven that the goods are there—over twenty million tons of eight to ten dollar ore. But the development and operation of a property of that extent and character demand conditions where men and materials are readily obtainable, and these conditions most certainly do not exist now. In a recent



Where the original discovery was made at Flin Flon



Some of the buildings at Flin Flon camp

announcement the Hon. Provincial Treasurer intimated that the Government would arrange for the construction of a railroad into the district at an early date. The importance of the carrying out of such a programme can hardly be overestimated and the result would be the removal of the main obstacle to the commencement of an immense copper mining industry.



Examining a new discovery at Phantom Lake



5000 tons of copper ore piled at foot of Schist lake

The Mandy.—On the other hand the Mandy camp on Schist Lake is one of continual activity. Why wait for the railroad when there is an orebody to work on which is solid chalcopryite and the shipping ore runs over 21 per cent. copper? There is now a dump of five thousand tons of this valuable ore at the foot of Schist Lake, ready for the winter haul to Sturgeon Landing over thirty miles away.

This ore has been brought from the mine during the summer by barge, but low water prevented further transportation in this way. Before the season is over the pile will have been increased by an additional thousand tons, and at the mine another fifteen hundred tons will be ready for the teams. Forty-five men, all that can be obtained, are now employed. The shaft is down two hundred feet, with approximately one thousand feet of drifting. Mining operations will continue steadily throughout the winter.



The Mandy Mine



The Mandy copper mine, Northern Manitoba

Mr. Chas. R. Miller, ex-Governor of Delaware, vice-president of the Mandy Company, recently made a visit to the mine and found the work progressing very favorably under the management of superintendent H. C. Carlisle. While at The Pas he made arrangements for the hauling by team next winter of a minimum of ten thousand tons of ore. The contract was let to Mr. C. B. Morgan who has handled this work satisfactorily in the two proceeding years.



5000 tons of copper ore at the foot of Schist Lake. This will be hauled in winter to Sturgeon Landing, and then in summer to The Pas.

It will come as a surprise to most people to learn that already three and three-quarter million pounds of pure copper have been realized from this mine, and it is confidently anticipated that this season's operations will more than double this total.

Copper Lake Sulphides.—Peculiar as it may seem, the most extensive orebody in the whole district is that regarding which there is probably the least general information. A very large body of sulphides consisting of pyrite and nickelliferous pyrrhotite has been located on Brunne and Copper Lakes, which lie about ten miles north-east of Athapapuskow and north of the Cranberry Lakes. The discovery and first locations were made by Hugh Vickers in 1915. He staked four claims for himself and associates. On one of these, the Deighton, the mineralization extends nearly all over the west half of the claim and is continuous for the entire distance of the four claims. The ore assays; iron 30 to 40 per cent., sulphur 20 to 30 per cent., gold a trace to two dollars, silver a trace to a dollar and eighty cents, platinum a trace, copper a trace to 6/10 per cent. twelve pounds to the ton, nickel a trace to 4/10 per cent. eight pounds to the ton. The orebody is so large and so heavily oxidised that systematic sampling has not yet been attempted and the above results were received from massive unaltered sulphides picked at random.

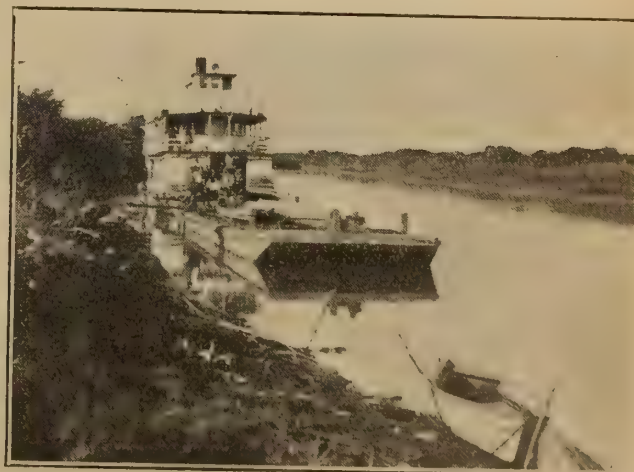
J. P. Gordon who now holds an interest in these claims intends cross-channeling the lode with the intention of cutting through the gossan and heavy oxides and it is hoped that high grade streaks will be uncovered that will give the body a decided commercial value.

J. B. Cameron has done considerable work on a claim to the south-west of the above claims and has exposed a large body of massive pyrites.

Stuart and Moore have a number of claims to the south-west of Cameron's. They have already done considerable trenching and intend working on the orebody during the coming winter. Mr. Stuart advises that their assays have been very encouraging.

Some idea of the size of this orebody may be conceived when it is explained that the body has great width and is continuous for five miles. But when one is on the ground the extent of the body and its irregular shape demonstrates effectually that the property cannot be investigated satisfactorily without the aid of a core-drill. The body contains millions of tons of sulphur (low grade), and if values are found in the base and precious metals, the sulphur contents may possibly some day become worth while.

The districts of Flin Flon, Schist, Athapapuskow and Copper Lakes, will no doubt come into their own as shippers of concentrates when the transportation dif-



Steamer with barge of ore on way from Sturgeon Landing to The Pas.

difficulties are solved, and a railway constructed into the country.

A New Gold Strike.—The sulphides of Copper Lake have taken on a much greater interest of late owing to the spectacular, gold find made by Karl J. Peterson. Peterson's find is in a quartz fissure vein about six feet wide which is cutting across the formation at right angles to the strike. The coarse gold was found within three hundred feet of the south boundary of the Deighton claim and the vein is exposed to where it disappears in the muskeg near the line of that claim. Some of the richest specimens of free gold ever shown in Manitoba have been taken from the Peterson claim.

Mr. Thompson Explains Functions of Office of Fuel Controller

As Fuel Controller for British Columbia, Mr. Nichol Thompson, of Vancouver, B.C., explaining that there appears to be some misunderstanding regarding the functions of his office, has issued a statement in which he enumerates his duties as follows:

- (a) To supervise the distribution of all coal or other fuel imported into or made available within such province.
- (b) To develop the demand for and supply of wood and other coal substitutes to the greatest possible extent.
- (c) To promote and administer any organization prescribed by these regulations within the province.
- (d) To gather and compile statistics dealing with the production and consumption of fuel of all kinds within the province.
- (e) To promote within the province the greatest development of any coal areas available.
- (f) Generally to assist and advise the Fuel Controller of Canada in the discharge of his duties and to enforce any regulations that may from time to time be prescribed by him.

Mr. Thompson continues: "Full powers have been given to the Fuel Controller to handle the situation and regulations have been issued by his department making it compulsory for coal mine operators and dealers to make returns of the quantity of coal produced and on hand and particulars of sales. Broadly speaking his department exercises for the national benefit and in the interests of the Allied governments, the widest possible control over the production, distribution and sale of fuel of all kinds.

"Under orders already issued by the department the price of coal in British Columbia has been fixed and is subject entirely to regulation, as is also the profit which may be made by dealers. There is, therefore, no possibility of profiteering on the part of anybody connected with the fuel business by reason of the demand outrunning the supply; as might easily be the case in a situation such as faces the eastern part of the United States and Canada at the present time.

"I might say that from my official experience the wisdom and necessity of close government control is realized by all fuel interests at the present time, and I have received a full measure of co-operation in carrying out the duties involved.

"There would appear to be some apprehension in the public mind as to the possibility of serious fuel shortage in British Columbia during the coming winter. This is not borne out by the facts, as may readily be demonstrated.

"Firstly, with regard to coal, our principal fuel. The demand for coal at the present time is far in excess of the supply, taking into account the demands for export; but the principle has been established that no coal may be exported without a permit from the Fuel Controller, and it is the policy to take care of the needs of home consumers before allowing export. As an instance, the United States Navy wants 130,000 tons of British Columbia coal during

the current year, but so far it has not been found practicable to give them more than 7,000 tons. The needs of the British Admiralty are considered to be of prime importance and our first care is to take care of bunker requirements of war vessels and British controlled shipping entering our ports.

"There has been a great increase for bunker coal from this source, but it appears likely that 160,000 tons additional will be required to bunker the new shipping now being completed in the Pacific ports of the United States and British Columbia, which will sail during the next few months under Admiralty requisition. As an instance of the operation of the permit existing I might mention that in July applications were received for permits to export 18,000 tons of coal for South American points, but the situation did not warrant the granting of permits for more than 6,000 tons."

Mr. Thompson concludes by summarizing statistically the result of coal mining operations in this Province up-to-date this year, figures which have appeared in these columns from time to time. They indicate that the record of 1917 for the first six months has been excelled. From this he argues that there is no reason to believe that the shortage feared is likely to occur although the consumer is asked to make his purchase of the winter's supply without delay. He concludes with the remark that "it is the policy of this department (fuel control) to urge dealers to create by the end of October a large reserve stock at their various depots, to be available in case of emergency."

OPENING COAL DEPOSITS AT PRINCE RUPERT AND PRINCETON.

The opening up and development in a small way of coal outcroppings is being given more attention in British Columbia as a result of the increased demand and the higher prices received for coal. One of the most important of these is situated on the Grand Trunk Pacific Railway not far from the City of Prince Rupert. The Government has assisted in the construction of a road to the property and the owners and operators are confident that they will be able to take care of the greater part of the domestic demand of Prince Rupert and the adjacent district this winter. Another enterprise of a somewhat similar nature is that of the Osoyoos Coal Co. at Ashnola, nine miles from Princeton, B.C. This has been re-opened and the coal will be "hailed into Princeton by motor trucks for local use and for shipment by railway to outside markets.

COST OF COAL PRODUCTION IS INCREASING.

There appears to be no finality to the upward tendency of costs. In the past year and a half, or two years, the wages of coal miners in British Columbia, roughly speaking, have risen 45 per cent., in addition to a 50 cents a day war bonus. In other words a man who was receiving \$3.65 a day in wages now is getting \$5.79 or, if he works an average of 30 days in the month, which most of the overmen do, he gets approximately \$174 a month. This is small compared to what some of the best coal miners are making, besides being considerably above the scale paid some of the Coal Mine Inspectors. The continued advance in living costs, however, has resulted, according to authoritative report, in the decision by the miners to request a further increase, and it is understood that they have forwarded to the proper quarters a request that the scale be boosted a further \$1 a day. It remains to be seen whether the Fuel Controller will find that this is justified by present living conditions; in comparison with those which existed at the time the last raise was allowed. If the men are supported it will mean, no doubt, corresponding addition to the selling price of coal which went up only a short time ago despite the protests of an indignant public.

Discovery and Exploration of the Belcher Islands*

By ROBERT J. FLAHERTY.

In August, 1910, Sir William Mackenzie, president of the Canadian Northern Railway, engaged the writer to undertake a journey to the Nastapoka Islands, outliers of the east coast of Hudson Bay in $56^{\circ} 5' - 57^{\circ} 50' N.$, for the purpose of examining and reporting upon the commercial value of the iron-ore deposits found upon certain members of the group. Sir William's interest in these deposits was connected with his interest in the new Hudson Bay route for the shipment of grain from the Manitoba grain fields to the European market and the opening of the bay to commerce by rail with Lower Canada and by ship through Hudson Strait with England. The route projected is from The Pas, a branch line terminal of Sir William's (now the Canadian Government's) transcontinental railway, to Port Nelson on the west-central coast of Hudson Bay, thence by ship through Hudson Strait and across the North Atlantic to Liverpool. This is a project which, if practicable—a matter still in question—is interesting not only because it would provide a wheat route shorter by a thousand miles than those now in use, but because it would also make immediately available such resources of the vast seaboard of Hudson Bay as might be found to be of commercial extent and of advantageous situation on or near tide water.

This seaboard bounds an area 1,200 miles long by 600 miles wide, 350,000 square miles of inland sea, and embraces the semi-arable hinterland of northern Ontario and northwestern Quebec, the semi-barrens of the Indians, the barrens of the Eskimos, and an arctic area of perpetual ice-bound sea. Nearly two-thirds of this region, indeed, lies within the subarctic and arctic zones of climate.

The white population of the region numbers some hundred and fifty "fur men," factors of the Hudson's Bay Company and their apprentices. From their posts, six along the east coast and six along the west, two hundred miles apart on an average, they control the trade of the country's native inhabitants, who themselves number less than three thousand all told. Exploration of the "East Main," as the east coast is locally termed, on the part of the Hudson's Bay Company has, despite their two and a half centuries of occupation, been negligible. Under their trading system the native brings his furs to their posts along the seaboard and thus renders unnecessary any expeditions on their part for trade extension—expeditions which would, if made, inevitably involve a certain amount of geographical exploration. Of the score or more of rivers that flow into James Bay and Hudson Bay along the east coast only two have been explored to their sources. The largest river entering James Bay, the Big River, is not only unexplored to its source, but is unknown beyond sixty miles from its mouth. The country's vacant spaces therefore can be imagined.

For such information as we have of the coast and its interior we are indebted largely to the remarkable explorations of the late A. P. Low, of the Canadian Geological Survey, whose work, covering a period of more than twenty years, has given us the most detailed and reliable maps and descriptions of the region available. It was Low's detailed reports of the Nastapoka Island discoveries made in 1877 by Dr. Bell, also of the Canadian Geological Survey, that formed the basis of the investigations which I had been commissioned to make.

How this undertaking, involving three further expeditions extending over a period of six successive years, eventually led to the rediscovery, if such it may be called, of an island land mass more than 5,000 square miles in size, lying along the East Main almost within sight of sailing routes of the Hudson's Bay Company to the west-

ward and within a hundred miles of the company's centuries-old post at Great Whale River to the eastward, is a matter of such interest that I give the incidents here just as they happened.

From the railway frontier of northern Ontario, in late August, 1910, I journeyed by canoe down the Mattagami and Moose Rivers to Moose Factory on James Bay, thence in a small Hudson Bay sailing craft across James Bay to Fort George on the east coast, where, weatherbound, I remained until the formation of the sea ice in December. The journey up the coast was then undertaken with relays of sledges with dog teams and native drivers; the first relay at Cape Jones, the northeastern extremity of James Bay, which marks the southern boundary of the subarctic habitat of the Eskimos; the second at Great Whale River, the most northerly post of the Hudson's Bay Company on the East Main, from which point a final 150 miles brought me to the Nastapokas—a distance all told from the railway frontier of 800 miles.

The Nastapoka Islands, ranging in size from a sea-swept reef to an island thirteen miles in length, are grouped in a chain for a distance of 120 miles at an average of four miles from the mainland, forming the spacious Nastapoka Sound. Save the southernmost they lie beyond the limit of trees; such vegetation as they contain—mosses, lichens, and creeping willows—is typically subarctic. The largest of the ore deposits are located on the two central islands of the group, Gillies and Clarke, which are 12 and $3\frac{1}{2}$ miles in length respectively. Their eastern shore line is broken into a series of cliffs, rising, according to Low, to a maximum elevation of 350 feet, where the various rock members are everywhere graphically exposed. These rocks have been identified by Dr. C. K. Leith, of the University of Wisconsin, as of Animikiean age. His identification he bases on a correlation with the Animikiean rocks of the Lake Superior region, and its interest, economically considered, lies in the fact that it is to these Animikies and the enormous mineral deposits characteristically associated with them that the Lake Superior region in great measure owes its commercial importance.

The examination of Taylor and Gillies Islands completed (the ore deposits were found to be of no present economic interest), I prepared to return to the railway frontier. It was at this juncture that Nero, my driver, one of the only two Eskimos of the seaboard who could speak English, mentioned large island to seaward of the Nastapokas, where lived a tribe of Eskimos whose hunting ground contained great walrus herds, thousands of geese in spring, salmon, seal, bear, etc.—game supply being to a native the only characteristic of a strange land worth consideration. I remembered then, for the first time since leaving Charlton Island en route northward in the preceding fall, a map and interesting information I had received there concerning these same islands from a servant of the Hudson's Bay Company, an Eskimo, Wetalltok by name, head man of the encampment, whom the company had imported from the Great Whale seaboard some fifteen years previously. The map, drawn on the reverse side of an old missionary lithograph, represented Wetalltok's hunting grounds previous to his migration—lands which on the admiralty charts are known as the North and South Belchers, the largest of them not more than six miles long.

The Belcher Island Eskimos.

On the return, to Great Whale River I questioned Harold, post interpreter, concerning the post trade with the island Eskimos and learned how every year the island-

ers, crossing the sea ice, bring bear, seal skins, walrus ivory, and fox skins to barter for tobacco, tea, sugar, matches, bits of finery, powder and shot, and a gun perhaps, if by good fortune there is a "silver" (fox skin) among them. They cross when the ice fields, the largest area of fixed ice in Hudson Bay, are frozen so as to be immovable between the islands and the mainland during the extreme cold months of February and March, a period rarely longer than six weeks. During the remaining months of the year they are isolated from intercourse with the mainland. Harold described how distinctly they differed as a tribe from the mainlanders, not only as to costume in winter, when they wear the feathered skins of eider ducks in place of the mainlander's deerskin, but in speech as well; which, he explained, was more "like the talk of children." He told how primitive they were and how poor as hunters—the latter a damning fault in Harold's Hudson's Bay Company eyes. Harold estimated that the island population numbered some 150 souls, thus corroborating information I had received from Wetalltok and confirming my impression of the extent of their territory.

The Second Expedition.

By June of the following year, 1911, the expedition was under way. I again arrived this time by the Missinaibi route, at Moose Factory and there secured a thirty-six foot sailing craft for the cruise to the islands. To make a long story short, our little craft proved inadequate for the work in hand, and we arrived at Great Whale River post too late to impress a crew for the crossing. Wintering at Fort George, therefore, I waited eight months for an opportunity to cross over the sea ice from Great Whale River, but was again doomed to disappointment when, on the point of making departure with two Eskimos, the field ice broke, disrupted by an extremely heavy gale, an occurrence unique in the twenty-eight years of old Harold's experience.

All thought, therefore, of reaching the islands was abandoned for the remainder of the winter and until the following open season. Whereupon, following an idea that had been shaping itself in my mind, I planned to explore an ore-bearing rock series, similar in character to the Nastapoka series, reported by A. P. Low as occurring along the lower reaches of the Koksoak River in north-eastern Ungava, 100 to 150 miles inland from Ungava Bay. I hoped to find an extension of that series farther north on or near tidewater of southwestern Ungava Bay. The undertaking involved two traverses across northern Ungava through the hitherto unexplored portion of the peninsula; the first by sledge along the 57th to the 59th parallels eastward from White Whale Point on Hudson Bay to Leaf Gulf on Ungava Bay; the second by canoe along the 60th parallel westward from Payne Bay on the Ungava seaboard to the mouth of the Povungnituk River on Hudson Bay. The second traverse was undertaken only when I found that the return journey I had planned ascending the Koksoak River to the height of land, thence by the headwaters of the Great Whale River to Hudson Bay, would, in any event, owing to the unusually late break-up of the Koksoak River, bring me too late on the Great Whale seaboard for the crossing I had intended making that summer to the islands.

The Third Expedition.

So it happened that in October, 1912, a year and seven months after leaving civilization, I again arrived in Lower Canada with the expedition to the Belchers still unaccomplished. However, with a persistence altogether characteristic, Sir William said, "Get a ship." This meant outfitting on an adequate scale at St. Johns, Newfoundland, and proceeding through Hudson Strait and southward along the eastern coast of Hudson Bay. Accordingly the topsail schooner Laddie, of 83 tons register, was purchased from Captain Sam Bartlett, the well-

known Arctic navigator of Brigus, Newfoundland. Captain H. Bartlett was put in command. The crew were: S. Gushie, mate; H. Spracklin, boatswain; McLeary, engineer; W. Robertson, cook; and R. O'Leary, K. French, and J. Robertson, seamen. S. Sainsbury and E. E. Laduke completed the personnel of the expedition.

Though we cleared St. Johns on August 17th, 1913, it was not until a year afterward, late August of 1914, that we finally put into the bay. This was on account of our delayed departure from Newfoundland, which brought us so late into the strait that we were stopped there by winter. Winter quarters were erected in Amadjuak Bay on the south-central coast of Baffin Island, and the ship was sent back to Newfoundland with orders to return the following year over the first open water. During the year we carried out explorations along the seaboard. An attempt was made to explore the unknown coast line of Fox Channel; but an inadequate outfit and impassable rough ice made the project impossible and, at the Trinity Islands, 35 miles west of Cape Dorset, we were turned back. A small portion of the interior of southern Baffin Island was explored as far north as Amadjuak Lake. We compiled an ethnological collection for the Royal Museum of the University of Toronto, and with a motion picture outfit filmed the travel and igloo life and some of the religious performances, conjuring, and dances of the Baffin Island Eskimos.

The Laddie was six weeks en route to our relief, having encountered heavy ice all along the northern Labrador coast and at the entrance to Hudson Strait; in the strait she was nipped in a heavy ice stream which came near sinking her. On the 19th day of August, when we were living on the rag ends of our provision supply, she finally arrived, somewhat bruised at the bow and with a bent propeller shaft, but not beyond repair; and on the 23rd of August we set sail for Hudson Bay.

Arrival at the Islands.

From Cape (Sir Thomas) Smith a course was laid due south and off shore some seventy miles. In latitude 59° we encountered thick, foggy weather, which was continuous to 56° 30'. We had sighted small islands, barren, low masses of trap, all of them less than two miles in length, whose outlying waters were shoal and infested with innumerable reefs. Fearing accident, toward night-fall of September 8th, the ship's course was laid to eastward for sea room over night, but within the hour she grounded on a sunken shoal, where she pounded heavily through the night. When daylight came we made out through the lifting fog a small island a half mile to westward, while to the northeast, the east, and the southeast lay a nest of boiling reefs.

Contrary to our expectations of total wreck, at noon, by aid of the tide and the discharge of her ballast and oil fuel, the Laddie hobbled off unhurt. Our good fortune did not end here, for the watering crew, taking the ship's casks ashore to refill them, climbed a low hill of the small island's northern end and from its vantage saw land to the west extending north and south over nine points of the compass and distant approximately twenty-five miles; obviously it was an island seaboard at least sixty miles in length—identifiable only as the eastern coast line of the Belchers.

That evening we arrived at the northerly extreme of the island, logging twenty-two knots for the distance. From the crest of the shore range, a bold island-free coastline of barren, ice-scoured diabase descending some 250 feet half rounded, like a whale back into the sea, we gained a view of unbroken ranges of land to the westward, barren save for plots here and there of russet mosses, studded with tiny lakes, and extending inland to a horizon twenty miles away, and here, typifying as strikingly the topography of the country as do those of the Nastapokas

and the mainland, lay the Animikies—first the costal eruptives, and beyond them the red bands of shale and marl, the yellow of the quartzites, and the white gray of limestone, all paralleling north-northeast and south-southwest, the trend of the island generally.

A week was spent along the island's east coast. Six miles to southward of this first anchorage we entered a snug bottle-necked harbor, and, while the crew rebalanced the ship and did such overhauling as under the circumstances was possible, we made cross-wise trips inland and a launch cruise to the southward, covering short distances only, however, since we found the ore series we were looking for on the shores of the harbor itself, and detail work upon it consumed most of our time. We kept a sharp lookout for natives, but none were seen; though recent fire places, boulders, and old goose blinds were noted at several points along the shore.

Embarrassed by the unseaworthy condition of the ship, on the morning of September 13th, we cleared the islands, southward bound, to berth her for the winter at Moose Factory. At Great Whale River post the expedition instruments and gear were discharged and stored away against our return islandward the following open season.

Our testimony to the extent of the land we had seen was received both at Great Whale River and elsewhere on the bay with open skepticism and no little "pleasantry" on the part of Company men whose life's experience had been along the Great Whale seaboard.

We arrived at Moose Factory on October 2nd, and there experienced an aftermath of the island shipwreck, when the Laddie, discharged of her ballast and gear, filled to the engine room, but settled, fortunately, on a shallow river bar, over which she lay at anchor until berthed.

Fourth Expedition.

After spending the winter in the confines of civilization we again reached our field of operations in September, 1915, when the Laddie again dropped anchor in the shelter of a Belcher Island sound. On this, our second visit to the islands, the explorations were carried on continuously through the winter and summer until the following September. They were as comprehensive as the limited resources of the expedition in men and means permitted, for only the ship's master, W. Robertson, and a Moose Factory servant, to both of whom I am deeply indebted for what was accomplished, remained with me through the winter and following summer. The remainder of the crew were sent out in October and February owing to our lack of fuel and provisions. By Mid-March our fuel had become exhausted, and the Laddie, now crewless anyway, became the victim of circumstance and afforded us a fuel supply by her masts, yards, bowsprit, rails and cabin—all of her in fact that was combustible. The following open season's work and the final journey from the islands were carried out in the Nastapoka, the same diminutive craft we had attempted to use in our first futile effort to gain the islands from Great Whale River on our second expedition.

Topography and Structure of the Islands.

The island ranges, barren hills, the highest of them not more than 480 feet as determined by aneroid, lie like bands of rounded ribbing, paralleling the islands' trend. This is typical of the Animikean rocks, which were found everywhere to comprise the rock system. Eruptive diabases, extending over a third of the island's surface area, include the more prominent of the ranges and are distinguishable by their conspicuous brown black appearance, by their generally more barren condition, and by their massiveness. They form a striking contrast to the sedimentaries, which lie in folds, synclines and anticlines,

dipping east or west, as the case may be, at an angle which varies from 50° to 5°.

Owing to the absence not only of tree growth but also of soil, except where to a local extent it occupies the floors of valleys, the rock formations are everywhere so well exposed that with a field glass from a distance of six miles or more we were able to locate the white bands of quartzite, the reddish masses of the ore series, and the jet-black hills of the eruptives. This absence of trees and soil was a factor in facilitating exploratory work whose value can hardly be realized by one not familiar with such conditions.

Throughout the interior of the larger islands lakes are everywhere found. They range in size from goose ponds and pools in the peaty tundra of the valleys to the magnificent Kasegaleek Lake (Lake of Seals). The smaller lakes are generally shallow; in many the ice freezes to the bottom, that is to a depth of six feet. The lakes not thus frozen in winter contain an abundance of Arctic salmon and whitefish, the only species of fresh-water fish found and an important source of the islanders' game supply during the open year until the middle of December. Kasegaleek Lake, 43 miles in length and, on an average, 7½ miles in width, occupies the largest and central island of the group. It lies some 40 feet above sea level and discharges from its southwestern extremity through a small river 10 miles in length. This river is broken into a series of lake expansions and descends by rapids, none of them too rugged for kayak travel to the sea. A mile from its mouth it is 200 feet wide, has an average depth of 4 feet, and a current flowing at the rate of 3 miles per hour. The eastern shore line of the lake is composed of almost sheer rugged cliffs and steep hills of diabase, averaging 150 feet in height and extending nearly the entire length of the lake. On the lake's northeastern portion, a U-shaped bay extends eastward to within 1,500 feet of tide water, to which, through a canal, the water of the lake could easily be led, with a fall of 40 feet. The western shore of the lake is less rugged and is broken by islands and long-fingered indentations which run parallel to its length. The islands increase in number to southward, being most numerous in the southwestern portion. The natives say that the lake is extremely deep. Unfortunately I had neither time nor opportunity to make soundings.

Innumerable pools and small lakes on the islands and throughout the low tundra of the western shore are breeding-grounds for geese during the months of May, June, and July. At this season the natives come there to hunt them, to gather eggs, and to fish for the Arctic salmon which then are spawning in the gravels along the shore line and in the mouths of entering streams. Here also they hunt the fresh-water seal, with which, they assert, the lake abounds; hence its name. Its clear, green water, hemmed in by the jet walls of rugged shore, with a traverse that extends to a landless horizon when viewed from either extreme, forms, despite the dearth of trees and vegetation, a picture that is singularly beautiful.

Navigation.

Good harbors, ranging from sounds to small and snug bottle-necked anchorages, occur throughout the islands. With proper charting, the approach from sea, save along the southwestern coast, should not be at all dangerous. The season of open water varies greatly, however. During the year of our residence the field ice cleared on June 10th, and did not return again during the summer. We gathered that this was a very unusual occurrence and was due to the prevalence of northerly winds during May and June when the sea ice was rotting and being broken by the tides. The Eskimos say that in some years the islands have been surrounded by pack ice as late as mid-August, and that ordinarily the annual clearance occurs about the first week in July. For ships built for the navigation of Hudson Strait the average date of approach to the islands

should be approximately the first week in July, if not earlier, since much of the field ice, if still existent, would then probably be rotten enough to offer no obstacle. Obviously only ice observations covering a period of years can yield results of definite value.

Climates.

The climate of the islands differs widely from that of the opposite mainland. Compared with weather reports from Great Whale River for the same period, our observations gave a far greater proportion of overcast skies and fogs, stronger and more constant winds, but higher and more equable temperatures. From October till early December winds of a velocity up to 50 miles were almost constant, and the sky was continuously overcast.

No snow covered the ground permanently until November 15th, and no ice was formed in the small lakes near the wintering base until December 4th, when the long period of winds ceased and a fortnight of calm, clear weather set in. The mercury did not fall below zero until January 2nd—a weather condition without precedent in my experience of the North. Great Whale River early in December had a minimum temperature of —30 degrees and recorded a constant average for the period well below zero.

On January 2nd, winter commenced in earnest. The month was characterized by constant drifting winds of a maximum force of 70 miles; calm days were unknown; and the average temperature was —16 degrees. In February the winds abated; there were many days of sunshine, a few of them almost calm. The average temperature for the month was —19 degrees. Throughout March strong winds again prevailed; by the end of the month the snowfall for the winter had reached its maximum, 4 feet; the average temperature for the month rose to —9 degrees. In April and May there was the usual prevalence of wind, and several blizzards occurred, each covering a period of from one to two days. In the latter part of May the weather broke and became warm and summery; in fact, there were heavy thunderstorms at this time. On May 28th, sledging over the ice fields was at an end, and by June 10th the field ice surrounding the islands had blown off to southward. Then commenced the most trying time of the year; for hardly two days together did fair weather obtain. From mid-June onward to the time of our departure on September 13th, exceedingly heavy gales of wind of from one to three days' duration occurred in every week. The prevailing direction of the winds was south-southwest for not only that period but for the entire year. Days of sunshine were rare; the sky was generally overcast; and rains, accompanied usually by heavy southeast winds, were frequent. According to the natives the weather we experienced during that year was not at all typical; usually, they said, the winds were fewer and less violent, and the temperature during the winter was lower. The remarkable lateness of the freeze-up (December 23rd) was, they said, without precedent. The minimum temperature for the winter was —48 degrees as compared with the lowest mean reported temperature on the mainland of —55 degrees. The maximum thickness of fresh-water ice was 5½ feet, and of sea ice 5 feet. The maximum temperature for the summer, occurring on July 25th at noon, was 70 degrees.

Minerals of Belcher Islands.

Our mineral explorations resulted in the discovery of four distinct ranges of iron-bearing rocks, 30 miles in length and 3 miles apart, one from another, in an east-and-west direction, on the eastern half of the island. The longest continuous outcrop found was 4 miles in length, with an average width of the orebody—if such it may be called, for it is a mixture of ore, jasper, and much other siliceous material—of 30 feet. This outcrop is the northern extremity of a range which follows for 25 miles

the eastern shore line of Keepaloo Inlet. Here from what is the western edge of an enormous syncline the ore series dip 40° to eastward and underlie Omarolluk Sound, 5½ miles across to its eastern shore, where the eastern edge of the fold is found, though in much leaner state and less exposed at surface. These figures may convey to the reader some idea of the magnitude of the largest of the iron ore deposits. No ore of high quality, however, was found. The best, in Keepaloo Inlet, averaged from wall to wall not more than 38 per cent. metallic content—obviously too low-grade a product for present operation in these latitudes. The principal detriment to the ore is silica; as far as phosphorus is concerned it is fairly clean, averaging less than .005 per cent.

In certain contacts between the silicified limestones and diabase on the western slope of Tookcarak Island were found occurrences in small stringers of calcite, of smaltite, and of cobalt bloom. There was no body of calcite, and the distribution of the minerals where found was sparse. Other minerals noted were manganese, occurring in small stringers in iron-bearing slates and chalcopyrites, some of the latter mineral containing as much as 30 per cent. of copper. Neither mineral was found in commercial quantity, however.

Other Expeditions.

In August, 1916, the writer's father, R. H. Flaherty, M.E., Dr. E. S. Moore, professor of geology in the Pennsylvania State College, and W. H. Howard, Dominion Land Surveyor, arrived on the islands. Dr. Moore and Mr. Flaherty made geological and mining reports on the expedition discoveries. Dr. Moore also made a geological cross section of the folds of rock series over the eastern half of the islands. Mr. Howard's work comprised an accurate determination of the position of the islands in relation to known points on the mainland as well as some detail surveys in connection with Dr. Moore's and Mr. Flaherty's reports to Sir William.

During the summer of 1915, that is the summer succeeding our first landing on the islands, the Hudson's Bay Company had made an expedition there with a local James Bay steamer and salvaged one of their sailing vessels which had been carried away by ice the preceding fall from Fort Churchill 500 miles across the bay. She had been reported to Mr. Mavor, the factor at Great Whale River, by migrating Eskimos, whereupon he had sent out his clerk, Mr. E. Renouf, a young Englishman, to verify the report. This Mr. Renouf did, crossing the field ice with two Eskimos, the first crossing over the ice to be made by a white man since Wiegand's in 1849. During our wintering Mr. Mavor and the Rev. Mr. Walton, missionary to the Eskimos of the Great Whale seaboard, visited me. All of this was the more interesting since the bay folk had been sceptical of Wetalltok's "Big Islands" yarn. The Big Islands are ancient history in the bay now, and Wetalltok stands vindicated.

MINING CORPORATION INVESTIGATING MINES IN BRITISH COLUMBIA.

Messrs. C. E. Watson and G. O. Randolph, the former being general manager of the Mining Corporation of Canada, Toronto, which corporation recently purchased the Woolsey silver property, on Silver Creek, near Revelstoke, B.C., have left for Northern British Columbia. Their intention, according to well authenticated report, is to make an examination of the famous Engineer Mines of the Atlin (B.C.) District, one of the best known gold producers of the Canadian West. The Engineer Mine is at present controlled by Capt. Alexander, who takes out considerable gold annually by means of a small stamp mill. For several years Capt. Alexander has brought out every year remarkable samples of native gold. On a number of occasions the property has been under option for large sums and, if Mr. Watson and his associates decide to make the purchase, the deal will be one of importance.

PERSONAL.

Mr. A. B. Clabon, of Vancouver, B.C., is credited with the successful consummation of a deal, by which the Mining Corporation of Canada will take and operate the Woolsey Group at Silver Creek near Revelstoke. The new owners will immediately start building a road, while development work and installation of machinery, will be pushed ahead with all possible speed.

Mr. Walter Vidler, of Boulder, Colorado, is in British Columbia encouraging prospectors to look for rock containing vanadium.

Mr. James Renney, Overman for the past two years at the Reserve Mine, operated by the Canadian Western Fuel Co., at Nanaimo, has resigned his position and gone into business, having taken over the interests of the MacFarlane Wharf Co., Nanaimo.

Mr. Francis John has been appointed Overman at the Reserve Mine to succeed Mr. Renney. Mr. John was Tipple-Boss at the Harewood Mines of the Canadian Western Fuel Co.

Mr. A. L. Rattray, formerly City Clerk at Nanaimo, has accepted the position of accountant with the Granby Consolidated Mining, Smelting and Power Co. at their new Colliery at Cassidy's near Nanaimo, B.C.

Mr. G. W. Bowen, vice-president and managing director of the Canadian Western Fuel Co., has left on a motor trip to California, where he will visit for some weeks, afterwards proceeding to Salt Lake City, Denver and Albuquerque.

Mr. T. E. Godson, Mining Commissioner of Ontario, accompanied by Mr. T. F. Sutherland, Inspector of Mines for that province, has been a recent visitor to British Columbia in the course of a, our of general investigation of the mining departments of other provinces.

Judgment has been handed down dismissing the claim of Robert T. Ward for \$11,000 for a mechanic's lien against the Bullion Mining Syndicate of Quesnelle Forks, B.C. The trial was held at Quesnelle, B.C., on June 28th and 29th of this year.

Mr. Cyril Knight, Mr. A. G. Burrows, and Mr. P. E. Hopkins, of the Ontario Bureau of Mines have returned to Toronto after spending the summer mapping gold areas in Northern Ontario.

Dr. W. G. Miller, Provincial Geologist, is still in England where he represents Canada on the Mineral Resources Committee.

Mr. T. F. Sutherland, Inspector of Mines, has returned to Toronto after visiting mining districts in Western Canada.

Mr. R. E. Hore has returned to Toronto from Milwaukee, where he attended the Allied Metals Congress.

Mr. W. A. Janssen, Canadian Steel Foundries, Montreal, has been elected vice-president of the American Foundrymen's Association.

Mr. M. Y. Williams, of the Geological Survey, has returned to Ottawa after a field season in southwestern Ontario oil fields. Mr. Williams has recommended several areas as worthy of attention and most of the recent drilling is on these areas.

At the Mossa Molybdenite Mine, Quyon, operated by the Dominion Molybdenite Co., mining has, up to the present, been by open pit. Underground mining will be begun shortly, a shaft having been sunk to a depth of 200 ft. for this purpose.

Of the 132,248 barrels of crude oil produced in Ontario during the first six months of 1918, nearly 50,000 barrels came from the new Mossa field.

MINISTER OF MINES VISITS BRITISH COLUMBIA.

Hon. Martin Burrell, Minister of Mines in the Dominion Government, is making a tour of British Columbia. Discussing the work of his department he says: "A large part of the energies of the Department of Mines at the present time is being devoted to an investigation of the production possibilities of such minerals as are necessary in the production of munitions of war. The purpose is to investigate such discoveries as may be reported with a view to securing development if the propositions appear to justify action on the part of the department. We are paying especial attention to platinum, because of the extraordinary shortage of this metal all over the world. The Ural Mountains of Russia were the principal source of supply before the war. Judging by reports which the department has received the Tulameen district of British Columbia is the most hopeful platinum prospect on this continent. To encourage platinum production the department has established a refinery for this mineral at the Vancouver (B.C.) Assay Office, and a considerable production already has resulted." In reference to the production of gold and the serious handicap which this branch of the mining industry labors under existing conditions Mr. Burrell said that the question was an involved one of international concern, and the matter of assistance could not be dealt with until a universal policy was decided upon.

COMMITTEE WILL INVESTIGATE SMELTER CHARGES.

Definite word has been received of the approval by the Dominion Government of the proposed investigation of the affairs of the Consolidated Mining & Smelting Co. of Canada with a view to ascertaining whether in its charges to mine operators and in its general dealing it has been fair to its customers, having special reference to the conduct of the large smeltery at Trail, B.C. The members of the Committee of Investigation, who have been endorsed, are Messrs. S. S. Fowler (chairman) and Ivan DeLashmutt, and James Anderson. Full powers are said to have been granted the Committee to take evidence on oath and arrangements are being made for expert metallurgical and accounting assistance. Mr. Fowler, a graduate of the Columbia School of Mines, is a man of wide experience in mining and smelting matters. For several years he was consulting engineer for the British Columbia Goldfields and many other properties and is consulting engineer for the Yankee Girl Gold Mines. He is best known as the manager of the Bluebell Mine at Riondal, B.C. Ivan DeLashmutt, the Superintendent of the Standard Silver Lead Mines at Silverton, B.C., was for many years with the Anaconda Smelter and later was testing engineer for the Utah Consolidated. He is a graduate of the Colorado School of Mines and for some time held a post as professor of metallurgy at the University of Arizona. Mr. James Anderson is the mayor of Kaslo, B.C., and has had extensive mining interests in British Columbia for many years. He is the agent for the George Alexander interests which control the Nettie L., Ruth, Silver Cup and other properties.

BUILDING MILL AT PRINCETON

Work on the new mill for the Canada Copper Corporation at Princeton, B.C., is underway, the foundation, as far as excavation is concerned having been completed, and a part of the concrete laid. The railway between Princeton and the mill site will be ready for steel by the 1st of November. Immediately upon the completion of this end of the road the grading between the mill site and Copper Mountain will be pushed forward, with a view to providing, at as early a date as possible, facilities for transportation of ore from the mine.

Magnesite quarries in Quebec are now producing about 12,000 tons magnesite per month.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Nipissing.

Production of silver from the Nipissing mines for the month of September, showed an increase of nearly \$6,000 over the August output, but at the same time was considerably below the average monthly production of the balance of the year. In his report to the president and directors of the company, Hugh Park, manager, says that during the month the company mined ore of an estimated value of \$256,461, and shipped products from Nipissing and customs ore of an estimated net value of \$545,528. The usual amount of underground work was performed at all the shafts. A small vein being encountered at shaft 73; it is one inch wide and assays about 1,500 ounces, but over its present exposed length the average assay is considerably lower than the above figures. The diamond drill has completed operations on R. L. 402. Several holes were drilled for formation purposes. No veins were encountered. The high grade mill treated 98 tons and shipped 513,713 ounces of bullion, while the low grade mill treated 6,348 tons. The following is an estimate of production for the month:

Washing plant.....	\$151,688
Low grade mill.....	104,773
Total.....	\$256,461

The record month of the Nipissing Mining Company for the current year was in June, when \$340,657 was produced.

Will Explore Properties North of Cobalt.

The Mining Corporation of Canada is making preparations for the extensive exploration of the property recently acquired near North Cobalt in the Township of Bucke. The property lies on the west side of the Nipissing Central Railway and was purchased from the railway company during the past summer. The old shaft on the property, which was sunk to a depth of 100-ft. on a promising vein in which cobalt was present, is being timbered and it is the intention of the company to carry this working to a depth of 300-ft. Electrically operated machinery will be used for development. The geological conditions prevailing in the immediate vicinity of North Cobalt are somewhat similar to that occurring in the productive area of the Cobalt camp, and the fact that ore in commercial quantities was never developed in the district is somewhat of a puzzle to leading mining men. However, the recent successful operation of the former Green-Meehan mine by its present owners, indicates more or less big possibilities in the south-eastern Bucke area, which may yet take its place as a valuable silver producer.

Kerr Lake.

The Kerr Lake Mining Company began its fiscal year with a production in September of 208,339 ounces of silver in the first month. This compares with 210,388 ounces in the corresponding month of one year ago, and is considered very satisfactory. The output was approximately 42,000 ounces less than August, but was almost on a par with last year's monthly average. With ore reserves estimated to contain upwards of 1,600,000 ounces of silver, the year is looked forward to with optimism.

The regular dividend of 25 cents per share has been declared payable December 16th, to shareholders of record December 2nd. The disbursement amounts to \$150,000, and is equal to 5 per cent. of the issued capital. The coming dividend will make a total of 20 per cent. paid during the current year, the total disbursement amounting to \$600,000. Since going on a dividend basis on October 4th, 1905, including the dividend just declared, the company will have returned to its shareholders \$8,-

010,000. This is the third highest record of Canadian silver mining companies, comparing with something over \$17,000,000 paid by Nipissing and \$9,240,000 by the Coniagas Mining Company.

Interesting Development Work at Adanac Mine.

The large new vein at the 310-ft. level of the Adanac mine recently encountered in the west cross-cut, and on which drifting is being done is about nine inches in width, the larger part of which is composed of nicolite and cobalt, with ruby silver. The drift is being driven to the south, and is in the Keewatin formation at a point close to the underlying diabase, which is dipping to the south. As the drift advances it draws farther away from the sloping diabase. Veins close to the contact generally show a tendency to split up, or are more or less irregular while a short distance away from the contact, they become more regular. Such is proving to be the case at the Adanac, and those most deeply interested anxiously await the result of each round of shots. On the Temiskaming property, which adjoins, during its early development drifting was carried on along a vein less regular and not nearly so well mineralized as that being worked at the Adanac, when without any other indication a round of shots revealed a high grade shoot of ore which netted the company several hundred thousand dollars, and started the company on its highly profitable career. Thus the present development of the Adanac is fraught with a great deal of interest. Assays from the vein taken recently have given slightly over one hundred ounces to the ton in vein matter in which silver was not visible, while in portions of the vein native silver is in evidence. A small shipment was made during the past month containing approximately three tons of high grade ore. Mr. R. A. Cartwright, president and Mr. E. M. Campbell, director of Ridgeway, Pa., recently visited the property and are confident of the near future placing the mine among the list of important silver producers.

Ore Shipments from Cobalt.

Ore shipments from the Cobalt camp during the month of September amounted to approximately 2,319,515 pounds, including shipments from the Pittsburg-Lorraine Syndicate of South Lorraine and Edwards and Wright, operators of the Green-Meehan property. These figures compare with shipments for the month of August of 2,554,180 pounds. From present indications the current month promises to establish a record considerably in excess of that of the month of September. It is usually the case that shipments during the fall show an increase. In point of silver shipped the Nipissing Mining Company appears to have assumed the lead, while the Mining Corporation of Canada comes second. The large ore reserves of the Nipissing lead to the belief that in future this company will maintain the lead as a bullion shipper from the camp. The company owns a large atreage which as yet has not been entirely explored.

Mr. Alfred R. Whitman, geologist, of New York, formerly of Cobalt, has given up consulting work to take an instructorship in War Topography at Columbia University, in connection with the Students' Army Training Corps. Mr. Whitman during recent years has distinguished himself and become one of the recognized authorities on geological conditions met with in Northern Ontario. Mr. Whitman said, in a recent interview: "I will not again be available for consultation work until after the war. I have definitely committed myself to this war work as long as it may last."

Work is under way on the Giroux property, in the township of Lorraine, near La Tour Lake. A small force of men are at work and additional supplies are being taken in. The property is being worked under lease by Cobalt men, and it is planned to ship ore during the coming winter.

McKinley-Darragh.

The current assets of the McKinley-Darragh-Savage Mining Company of Cobalt, are considerably more than the amount required to meet the dividend requirements for the year 1918, at the present rate of 12 per cent. per annum. The surplus as shown of September 24th, totals \$336,697. In addition to this highly satisfactory financial position, the current earnings of the company are more than sufficient to meet the dividend requirements of 3 per cent. quarterly. In 1917 the mine yielded upwards of 900,000 ounces of silver. While a slight decline in production may be looked for during the current year, output is considered to be fairly well maintained. Backed by this strong financial asset, the McKinley-Darragh is considered to be in a very healthy condition.

Gowganda Mine Will Produce 1,000,000 oz. of Silver This Year.

Production for the current year at the Miller Lake O'Brien property at Gowganda, the second largest silver mine in the Dominion, in point of ore reserves, will probably be about one million ounces, possibly more. Its operation being controlled by a closed corporation, the details are not available, except in approximate figures. Unofficial estimates place the ore reserves of the company at about six million ounces. As a result of the development of such a mine nearly thirty miles from the railway, and in view of the fact that the surrounding properties in a number of instances have similar geology, the past year has witnessed increased genuine and consistent development. In spite of the general shortage of labor throughout the district, the achievement of this company is one of the most notable in the mining history of the North Country. This one great mine has been the groundwork on which the prospects of the district are being developed. The company makes every effort to assist in the happiness of its employees, and with this end in view moving pictures and social evenings are provided by the management.

The Walsh Property, Gowganda.

The Crown Reserve Mining Company of Cobalt is understood to have dropped its option of the Walsh property in the Gowganda mining area, which it has had under option for the past year, and on which development has been carried to a depth of 200-ft. with lateral work at this level and also at the 100-ft. level. During the summer an encouraging vein was encountered at the 100-ft. level and drifted on for some distance, while the shaft was continued to the 200-ft. level and a cross-cut run to the vein at this depth. According to reports the results obtaining during the tenure of the option were sufficiently encouraging to warrant further work. However, a large cash payment fell due about the first of the present month, and when an effort was made to obtain an extension of time, one week was granted, at the expiration of which time the payment was not made and the claims reverted to the original owners. The original owners are said to be making arrangements for the continuation of the development of the property.

The Castle Property, Gowganda.

The shaft at the Castle property adjoining the Miller-Lake-O'Brien mine at Gowganda is nearing the 300-ft. level, where the development program consists of extensive lateral work. According to late reports from the property a vein system for which it was thought a cross-cut would have to be run at the 300-ft. level, cut across the shaft somewhat higher up. The vein is said to be encouraging. The Castle is under control of the Trethewey Mining Company of Cobalt.

A number of other properties besides the three above mentioned in the Gowganda district are receiving attention at present, and on a number of these promising surface indications are said to be present. With the increased activity of the district, it is highly probable further steps will be made to improve the transportation facilities to the camp as soon as the cold weather sets in.

Wright-Hargreaves.

The designing of a mill with a capacity of 150 tons per day for the Wright-Hargreaves property at Kirkland Lake is being proceeded with and the site for the new structure has been chosen. An excellent mill site has been selected just north of the No. 3 shaft on the shore of the lake. It is proposed to equip the No. 3 shaft with a large head-frame and the necessary equipment to meet the requirements of the central or main shaft. The head-frame from the No. 3 shaft will be removed north to the No. 1 vein and used for further work at this point. The designing of the mill at this time will permit of the order for machinery being placed in time for arrival and transportation to the property over the winter roads before spring. Providing nothing unforeseen happens to retard the work, the mill should be in operation next summer. The supply of labor for construction purposes is very limited at present. However, there are many possibilities which might tend to remedy this condition, in which case the work will be proceeded with more rapidly. The mine has been developed to a depth of 400-ft. and there are about a dozen faces in ore. Thus with the completion of the milling plant the property could immediately go on a producing basis.

Lake Shore Mines.

Operations at the Lake Shore mines, Kirkland Lake, continue to be of a highly satisfactory and profitable nature. The company is increasing the capacity of the mill. The September monthly statement showed the treatment of 1,860 tons of ore, and yielded \$44,500. This performance is considerably in excess of the estimated capacity production of the plant, and is chiefly due to the efforts of Mr. R. C. Coffey, the present manager, who designed the milling plant. The mill heads to date have averaged around 125 per ton with all ore coming from development work at the 200 and 400-ft. levels. One of the most significant features of the property is the tendency of the orebodies to show greater width as depth is attained. This is particularly true of the No. 1 vein, where in the west drift more than a score of feet in width of ore is showing in the face of the drift. Such orebodies, wholly intact, except for the amount of work necessary to prove their existence, may be fully counted upon to constitute a huge reserve. The ore at present in sight in the workings of the mine is sufficient to keep the mill operating at full capacity for a number of years to come, and added to this will eventually be greater length and depth of these orebodies. Thus it is highly probable that when the economic conditions become favorable the Lake Shore will enlarge their milling facilities. It is estimated that costs of production at the property are running between eight and ten dollars per ton, thus leaving a profit of \$15 per ton on a capacity of 60 tons of ore per day which is being treated. Upwards of 2½ per cent. every sixty days is being earned on the capital issued. The second dividend is expected early in December. These results have been accomplished under most adverse conditions and with a return to more normal times, the profits of the company would be much greater. The future for the Lake Shore appears exceedingly bright.

Ontario-Kirkland.

Plans for the operation of the Ontario-Kirkland property in the Kirkland Lake district have been consider-

ably enlarged upon. financial arrangements having been made for the carrying out of approximately seventeen hundred feet of underground work. After the completion of installation of the \$15,000 electrically driven mining plant, the shaft, which is now down one hundred feet, will be continued to a depth of 300 feet, where 1,500 of lateral work will be done. It is expected the plant will be installed by the early part of November, and the shaft will reach the 300-ft. level some time in January. A number of strong well-mineralized veins have been opened up on the Ontario-Kirkland property and development work underground will be centred on the vein which the shaft is being sunk on. However, two other strong veins are known to parallel the former, and these will also be tapped at depth to determine values.

Frank Huth, of Nazareth, Pa., president of the company, accompanied by William F. Meyer, of Bethlehem, Pa., and Walter E. Hurd, of Philadelphia, have recently paid a visit to the property. The claims which comprise the holdings of the company were formerly known as the Hurd group.

Kirkland Lake Gold Mines.

With the new mill almost completed at the Kirkland Lake Gold Mines property, much speculation is rife in the district as to whether it is the intention of the company to press the plant into service at once or not. Sufficient ore of a good milling grade has been blocked out underground to keep the mill in operation for some time and a large amount of ore is on the dumps ready for treatment in the new mill. However, whether or not milling operations are to be commenced has not yet been announced.

A central shaft is being sunk on the property with three compartments and will be connected with the various levels as the work proceeds. The underground workings of the Kirkland Lake Gold have been carried to a depth of 700-ft., the deepest in the Kirkland Lake Camp, and at this depth the mineral deposition proved consistent with the upper levels of the property and showed no signs that it would not continue to much lower depth. Almost a million dollar's worth of ore is said to be blocked out in the mine.

The Beaver Consolidated Mining Company, of Cobalt, which controls the Kirkland Lake Gold, owns nearly all the stock of the concern and have financed the development of the property and erection of the mill, and it appears reasonably sure that the shareholders of the company will eventually reap the just rewards of the energetic endeavors of their president and directors in their comparatively new mining venture.

Miller-Independence.

Drifting operations are under way both east and west at the 200-ft. level of the Miller-Independence Mine at Boston Creek along the big orebody. In the meantime the mill has been completed and the necessary additions made, and is now in readiness for operation. The capacity of this plant is approximately 40 tons per day. Owing to the richness of the ore to be treated, however, to make sure of good recovery only about twenty tons per day will be fed to the mill. Lack of water has formerly been one of the inconveniences at the Miller-Independence, but a dam has been constructed and an artificial pond made which will provide sufficient water for all requirements.

Additional working forces and two more machines are to be employed immediately. With the orebody at the 100 and 200-ft. levels being developed and a large amount of high grade ore already conveyed to the dumps, a considerable portion of which runs several hundred dollars to the ton, and in some instances well over one thousand dollars, the condition of the property and outlook for the future is exceedingly bright. The results of the first operations of the renovated mill are being looked forward to with keen interest.

Patricia Mine.

Four machines are now employed on development work at the Patricia Syndicate property at Boston Creek. According to recent advice, results being met with are proving highly satisfactory. Lateral work is being carried on at the 100 and 200-ft. levels, where either new veins or the continuation of those previously known are being developed. The steady wet weather of the past two or three months has made the matter of securing fuel a very serious problem. The swamp lands from where the wood was being obtained, have become almost impassable for horses, with the result that milling operations were suspended. This difficulty it is thought will be overcome with the arrival of cold weather.

Gold on Cotter Property.

A vein in which visible gold occurs has been opened up on the Cotter property at Boston Creek. The vein was picked up at a point within two or three hundred feet of the north-east corner of the Miller-Independence Mine. The strike of the new vein is directly toward the rich vein on the latter, and is thought to be a continuation of this vein. It has a width of from four to upwards of five feet and is dipping to the south. A diamond drill has been set up a little south of the vein and drilling has started. The first hole is being driven at an angle of 55 degrees pointing towards the north.

Work Begun on O'Donald Claims.

Work was commenced about the middle of the month on the O'Donald claims in the Boston Creek district, which are under option to Robert W. Norrington and his associates of Detroit, who also are operating the Cullen-Renaud group of claims in this district, with good results. The O'Donald is situated directly between the R. A. P. Syndicate and Patricia Mine. Although exceedingly well located and several times under option, during the course of which numbers of promising veins have been located on the surface, it has never been extensively explored, nothing more than surface prospecting, trenching and the sinking of test pits having been done.

Howie-Couchenour.

The mining plant at the Howie-Couchenour property in the Lightning River area has been in operation for the past couple of weeks and it is expected that from this time forward much better progress will be made. Difficulty in the transportation of supplies to the district up to the present time has proven a retarding factor. The shaft is down to a depth of about forty feet, at which depth the vein is about two feet in width and is understood to carry commercial values. The vein occurs in basalt formation at outcrop, while before attaining any great depth it is expected to enter the rhyolite formation which occurs in contact with the basalt at a point near the shaft. The rhyolite is dipping at such an angle as to indicate the likelihood of it cutting through the shaft a few feet below its present depth.

According to reports brought out from the Lightning River district by prospectors travelling out by way of Kirkland Lake, a promising vein has been found on the claims of Alex. Perron, situated about one mile east from the Howie-Couchenour property. The vein is reported to be about four feet in width and is said to contain visible gold.

The Lightning River Area.

The Ontario Bureau of Mines is preparing a report on the Lightning River Gold Area, covering the geology as well as the discoveries made to date. The field work has been completed by A. G. Burrows, geologist for the Bureau of Mines, and Cyril W. Knight, assistant provincial

geologist. One feature of the report will be the definite mention of rhyolite formation. Heretofore rhyolite found in this part of Ontario was usually in a more or less altered state. However, such is not the case in the Lightning River district where the rock is found in an unaltered condition and in a clearly defined body. At Telluride, Colorado, silver and gold bearing veins have been found to occur in the rhyolite formation, thus, the addition of this formation to the other list of formations in which precious metals are likely to occur in Northern Ontario, may prove of much importance. The report will not be ready for distribution for some time, but when published will prove a valuable guide to prospectors and property owners in the district.

Good Year for McIntyre.

The belated annual report of the McIntyre-Porcupine Mining Company, for the year ending June 30th, 1918, shows total profits of \$811,571 as compared with \$716,722 during the previous fifteen months. The company reserved \$131,210 for depreciation as compared with \$114,736 a year ago and transferred to surplus account \$680,361, as against \$725,790 in the previous fifteen months. Dividends of 15 per cent., on the outstanding capital were paid, amounting to \$541,542 as against \$361,028 the year before. The surplus carried forward from the previous year was \$741,903, while for the current year \$872,172 was carried forward. The year's surplus after dividends and depreciation was \$139,000. The rate of profits on capital stock was nearly 18 per cent.

Owing to the fact that the company found it necessary to speed up development work on optioned properties with a limited staff the ore reserves show a slight decline from last year. Important new orebodies, however, were put in sight.

The outstanding bonds of the company were retired at maturity August 15th, 1918, which leaves the property free of all encumbrances. Approximately \$300,000 has been spent during the past two years in plant and equipment. Diamond drilling on the Plenaurnum property appears to have disclosed the presence of some good orebodies at a depth of 1000-ft. where the drift was extended from the Jupiter property and diamond drilling done.

The annual meeting of the company has been called for the 26th of October, at which time a vote will be taken to determine whether or not the company will exercise its option on the Plenaurnum property.

A dividend has been declared payable by the company to shareholders on record November 15th. The disbursement, which is of 5 per cent. will be made on November 30th, making the sixth dividend to date, three of which were made during the current calendar year and three during 1917. The present disbursement calls for \$180,514.15 and makes a total amount paid of \$1,083,084.90, since going on a dividend basis, February 15th, 1917.

The fact that the company holds such an enviable position to-day despite the strains of war conditions and is able to disburse such liberal dividends is concrete proof of the excellent physical condition of the property, and proof of its excellent management.

GOLD PRODUCTION OF NORTHERN ONTARIO.

With only three of the larger mines producing gold, that is the Hollinger, McIntyre and Lake Shore, and three of the smaller mills running, that of the Dome Lake, Davidson, and the Miller-Independence which is just starting up, it is particularly significant to note that the gold output from Northern Ontario for the current year is slightly exceeding that of 1917. The high grade ore of the Hollinger, McIntyre and Lake Shore has saved the situation. With a return to normal conditions the lower grade mines will be a big factor. Added to this will be the mines now in process of advanced development.

The following is a summary of milling facilities at the gold mines, with figures showing the approximate capacity of each:

THE PORCUPINE GOLD CAMPS.

Mine	Daily Capacity in Tons	Present Rate
Hollinger.....	2,800	Half
Dome Mines.....	1,350	Closed
McIntyre.....	600	Full
Schumacher.....	200	Closed
Porcupine Crown.....	140	Closed
Porcupine V. N. T.....	120	Closed
Dome Lake.....	75 to 100	Full
Davidson.....	70	Full
Totals.....	5,355	

THE KIRKLAND LAKE GOLD CAMP.

Kirkland Lake.....	150	New
Tough-Oakes.....	140	Closed
Teck-Hughes.....	80	Closed
Lake Shore.....	60	Full
Total.....	430	

BOSTON CREEK GOLD CAMP.

Patricia.....	40	Closed
Mill-Independence.....	40	Half
Total.....	80	

MUNRO TOWNSHIP GOLD AREA.

Croesus.....	50	Closed
Hill Gold Mines.....	50	Closed
Total.....	100	

Thus, in summarizing the gold camps, we have the following:

Camp	Tons Capacity
Porcupine.....	5,355
Kirkland Lake.....	430
Boston Creek.....	80
Munro.....	100
Total.....	5,960

Of this huge total, but slightly over one-third is being utilized, or some 2,102 tons daily. Therefore, the assertion that gold production from the Northern Ontario mines is being comparatively well maintained, and about on a par with 1917 is full of significance. With conditions returned to more or less normal, and milling facilities of close to 6,000 tons daily pressed into full service, it is not too much to expect that the output will closely approach \$20,000,000 annually. In addition to this are a number of properties awaiting favorable conditions at which time they will proceed with the construction of mills.

Therefore, without taking into account the numerous properties with exceptionally good prospective merit, as well as the enormous stretch of as yet unexplored territory, and by dealing only with the already proven mines, the gold mining is looming large.

THE MONTAGUE MINE

Within the last few months the Montague property has been reported on by A. A. Hassan and more recently by C. A. Burdock for New York capitalists. This property appears to be the most promising at present in Nova Scotia. The present work is confined to the Skerry Lead below the flat reverse fault that cuts this vein at a depth of 65 ft. Some extraordinary pockets or enrichments have been met with in the last three years. These enrichments are associated with stringers or angulars entering the main lead, and it is the experience of those working the vein that only angulars entering from the north cause enrichments. The vein averages about four inches in width and in value two and one-half ounces per ton.

SHAFT UNWATERED AT GOLDENVILLE.

Mr. John Warner, formerly underground manager of the Boston Richardson Mine, has been appointed manager of the Goldenville Consolidated Mining Co. This company has recently unwatered the Wellington shaft which has not been in operation for thirty-five years. The intention is to sink this shaft 200 ft. and develop the Wellington Lead and the Dewar Lead, 110 ft. to the north.

USING KEROSENE OIL ENGINES IN NOVA SCOTIA.

The kerosene oil engine appears to be meeting with success as a substitute for steam power at a few of the mines. This form of power can be adapted to the Nova Scotia Gold Mines, where with narrow leads the power requirements are small and the fuel question, always serious, has become impossible. Wood, the fuel chiefly used, is scarce in close proximity to the mines and it has become extremely difficult to get men to cut it. The oil engine is being used in some of the stamp mills which, due to narrow veins and small outputs, are only operated five or six days in the month.

WORKING MOLYBDENITE AT NEW ROSS, N.S.

The molybdenite deposit at New Ross, Lunenburg County, is being developed by the Nova Scotia Molybdenum Co., Limited, under the direction of Mr. H. C. Burchell, of Windsor. The ore is associated with a pegmatite dike in the granite area that covers the western end of the province. The molybdenite occurs in rather small flakes, irregularly distributed through massive quartz containing practically no other mineral but red felspar. A shaft has been sunk 100 ft. in the orebody. Two or three small shipments of ore have been sent to the Government Testing Laboratory, Ottawa, and have shown one-half to one per cent. molybdenum sulphide.

DEVELOPING TUNGSTEN DEPOSIT AT MOOSE RIVER.

The Scheelite Mines, Ltd., is doing a small amount of development work on the tungsten property at Moose River. The mill has not been in operation for several years, but about 250 tons of 10 per cent. ore has been mined and ready to be treated. A trace of platinum and gold estimated at 0.04 oz. per ton were found by an assay made at the laboratory of the Department of Mines, Ottawa, from heavy Wilfley table fines. Sperry-lite is thought to be the mineral present.

FOUR DRILLS IN OPERATION AT STIRLING, CAPE BRETON.

The Stirling zinc-copper-lead deposit at Stirling, Richmond County, Cape Breton, is being extensively drilled. Four drills are in operation and the company claim to date about 700 ft. orebody as proven. The ore occurs in altered igneous rocks and is composed of zinc blende, chalcocypite, pyrite and quartz. Assays made at the laboratory of the Mines Branch, Ottawa, show values varying from 4 to 30 per cent. zinc with as high as 7.5 per cent. lead and 3.5 per cent. copper, also traces of gold and silver. The ore is very complex.

DEVELOPING SALT DEPOSIT AT MALAGASH, N.S.

A deposit of rock salt thought to be the first discovered in Canada is being developed at Malagash, Cumberland County. A shaft at present 105 ft. is being sunk and is already twenty feet in salt.

Bore holes have proved about 600 square feet of salt with a thickness of about 40 feet. The salt is interbedded with limestone and gypsum.

THE VOIGHT COPPER CO. CASE.

The action for \$75,000 lien or damages which Edward T. Beck and Edward H. Grunder and the Voight Copper Co., instituted against Mr. and Mrs. Emil F. Voight arising out of a deal for the Voight copper claims at Ashnola, near Princeton, B.C., has been dismissed by Mr. Justice Clement of the Supreme Court of British Columbia, in a written judgment. The dismissal is without prejudice to plaintiffs' right to sue for a charge of \$19,000 not dealt with under the judgment. The counter-claims of the Voights for payments under an agreement was also dismissed, but without costs. Beck and Grunder claimed to have secured an option on the claims and organized the Voight Copper Co., and to have spent \$75,000 in improvements to the property when they were cancelled out by the Voights.

His lordship in his judgment finds that Mr. Beck in 1916 made it clear to the Voights that there would be no more funds forthcoming unless the Voights at once conveyed the property to the Voight Copper Co.; that the Voights were willing sellers, but refused to abandon their safeguards under their agreement and to convey until the full amount of the purchase price was paid. His lordship finds that the plaintiffs failed to carry out their part of the agreement for an active programme of development and therefore are not entitled to a lien or charge for the monies gone into the property. Mr. E. C. Mayers appeared as counsel for the plaintiffs and Mr. A. H. MacNeill, K.C., as counsel for the defendants.

SHIPMENTS TO TRAIL SMELTER.

With three-quarters of the calendar year gone, the ore shipments to the Trail smelter, Consolidated Mining & Smelting Corporation of Canada, continue to be somewhat smaller than they were for the first nine months of 1917—the figures being 277,664 gross tons for 1917 and 245,375 tons of ore and concentrates for the same period this year. Thus 1918 is 32,289 tons behind 1917 for nine months. September of 1918 has a total of 21,765 tons received against 39,293 tons for September of last year. The chief cause of the falling off this year in ore tonnage is the fact that for several months the Rossland Mines have been worked only on a limited basis, this being due to the present conditions attending the production of gold. Rossland ores, however, contain as well a few pounds of copper per ton and its withdrawal has resulted in the operation at Trail of only one copper furnace, which is handling, almost entirely, rich custom ore. On the 1st of October last year there were 142 mines shipping to the Trail smelter while at present there are but 112 different mines on the shipping list.

HAZELTON GOLD.

Mr. Nicol Thompson, chairman of the Board of Directors of the New Hazelton Gold Cobalt Company, submitted a report of development progress at the recent annual meeting of the directors. A shipment of molybdenite ore from this property was recently made to the government sampling works in Ottawa and the gross value was \$109 a ton. Another carload of the ore was being packed for shipment to the Anyox smelter, Granby Consolidated Mining & Smelting Co. The latter had been sorted more for its gold value but contained also a considerable amount of cobalt.

Recent British Columbia incorporations include, Silver Creek Mines, Ltd., Revelstoke, capital, \$750,000; International Coal Co., Ltd., Vicotira, B.C., capital, \$50,000.

SMELTERS ENQUIRY OPENS AT NELSON.

After marking time for several months there has been received a definite announcement as to the plans of the committee appointed by the Associated Boards of Trade of Eastern British Columbia to conduct an investigation into the matter of the treatment rates charged by the Consolidated Mining & Smelting Company of Canada Ltd. at its Trail Smeltery. The first session will be held at Nelson, B.C., on Thursday, October 31st, and is called, according to public statement, "to receive evidence from shippers of ore to Trail." That the inquiry is to begin immediately is taken as indicating that the members of the Committee have been given assurances by the Dominion Government that the expense of a thorough investigation into the grievances of the mine operators affected will be covered and that they have got authority to examine witnesses on oath, two demands which they made as a condition of their continuing the work.

MARKETS**TORONTO MARKETS.**

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.50 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 12 cents per lb.

Oct. 28, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 11 cents per lb.

Lead, 10¼ cents to 10½ cents per lb.

Antimony, 18 cents per lb.

Copper, casting, 30 cents per lb.

Electrolytic, 29½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

Oct. 28, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$11.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following quotations on the Standard Stock & Mining Exchange, as of close, October 26, 1918:

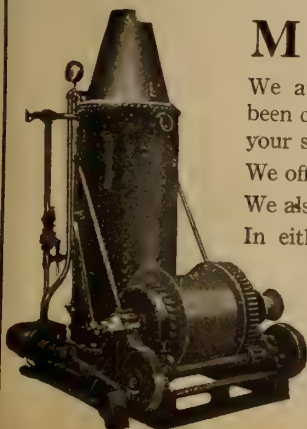
Gold.

	Bid.	Asked.
Apex .....	.06½	.06
Boston Creek Mines .....	.27	.25
Davidson Gold Mines .....	.31	.30½
Dome Extension .....	.24	.23

Dome Lake .....	.15	.12
Dome Mines	12.00	11.50
Eldorado .....	.02	.00½
Elliott Kirkland .....	.36	..
Gold Reef .....	..	.01
Hattie Gold Mines .....	.57	.50
Hollinger Cons	5.20	5.10
Keora .....	.08	.05½
Kirkland Lake .....	.39¾	.39
Lake Shore M., Ltd. ....	.90	.85
McIntyre	1.58	1.57
Moneta .....	.09	.07
Newray Mines, Ltd. ....	.15	.13½
Porcupine Crown .....	.16½	.15
Porcupine Imperial .....	.01½	.01
Porcupine Tisdale .....	.01½	.01¼
Vipond .....	.20	.17
Preston East Dome .....	.04	.03¾
Schumacher .....	.23¾	.23
Teck-Hughes .....	.35	.32
Porcupine V. N. T. Gold Mines ..	.18	.17
Thompson Krist .....	.05½	.05¼
West Dome .....	.11½	.11
Vacuum G. ....	.06	.05
Rockwood Oil, Gas .....	.11	.10½

Silver.

	Bid.	Asked.
Adanac Silver Mines, Limited ..	.09¾	.09¼
Bailey .....	.05	.04
Beaver Consolidated .....	.30½	.30¼
Chambers-Ferland .....	.10	.09½
Crown Reserve .....	.22	.19
Foster .....	.03	..
Gifford .....	.02¾	.02
Great Northern .....	.03¾	..
Hargrave .....	.04	.03¼
Hudson Bay .....	..	20.00
La Rose .....	.40	.35
Lorrain Con. M., Ltd. ....	.01	..
McKinley-Darragh-Savage .....	.40½	.38
Mining Cororation of Canada ..	2.85	2.50
Nipissing	8.70	8.55
Ophir .....	.06	.05½
Peterson Lake .....	.10½	.10
Right of Way .....	.04½	.03¼
Silver Leaf01	.00½
Temiskaming31½	.31
Trethewey25	.23
York Ontario01	.00½

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WILL USE B. C. BOG IRON ORE.

Bog iron from British Columbia will be in use shortly for fluxing purposes at the furnaces of Irondale, Wn., arrangements having been made by the owners of the property with the Pacific Coast Steel Co. The same company is using the magnetite ores of Texada Island, British Columbia, and the product of its plant is to be utilized in connection with the building of ships in the Puget Sound district. The contract entered into for bog iron calls for the delivery of 5,000 tons as soon as possible and a spur line is being run from the Pacific Great Eastern Railway to the property, which is situated near Mons, B.C., in order to provide satisfactory transportation facilities.

AN ORE SAMPLING PLANT FOR BRITISH COLUMBIA.

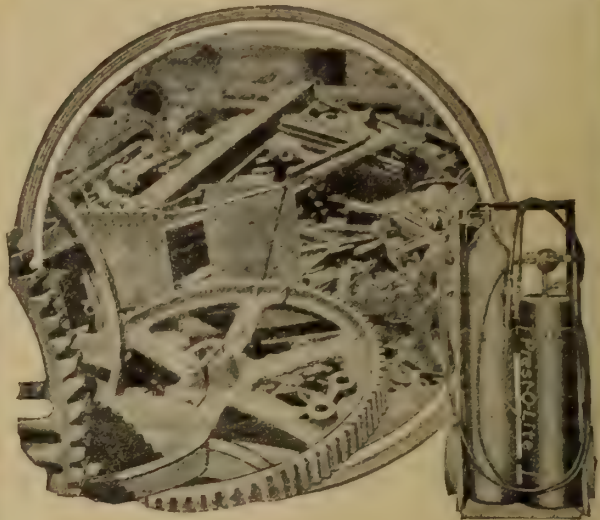
At a meeting of the Vancouver Chamber of Mines held recently, Hon. Martin Burrell, Minister of Mines, delivered an address in which he stated that an ore sampling plant would be established in British Columbia by the Dominion Government. He said that the matter had come before him some months ago. Mr. George MacKenzie, of the Department of Mines, now at the head of one of the parties engaged in field work in the Province, prepared a memorandum on the subject which convinced him that such a plant would be a material aid to the mining industry in British Columbia and that it also was required in the Province of Nova Scotia. In this connection the Minister referred to the high cost of the transportation of ores to the Government plant at Ottawa for treatment there, and wound up by declaring that the mining men of the West might rest assured that the matter would not be neglected.

PLACER MINING IN ATLIN DISTRICT, B.C.

Mr. Frank Mobley, member of the British Columbia Legislature for Atlin District, has returned to the Coast after spending the season in the placer mining section of the district. He speaks more optimistically than most of those who refer to the gold production of the North. While the output has been reduced 25 per cent. owing to lack of labor, according to Mr. Mobley, mining is said to be more profitable than it has ever been "because the methods of mining are improved." Formerly it was possible to make only four-ounce ground pay whereas now profits can be made out of two-ounce ground. Mr. Mobley summarizes the season's work on the various placer waterways of Atlin as follows: "Ruby Creek Hydraulic Mine has done very well; Boulder Creek, fair; at Birch Creek there has been a scarcity of water, and the output has been small; Pine Creek has had a fair season; McKee Creek did practically nothing owing to having to cut through a new channel; Otter Creek has had a good output and all the individual mines have given good returns. The general output, however, has not been more than 60 per cent. of that of former years.

ALASKA MINERS IN DANGER.

That there are several thousand miners and prospectors in the Kuskokwim River district, Alaska, threatened with famine is the effect of a report brought from the North by the captain of the power steamer, Ruby, which has just reached Seattle, Wn., in a damaged condition. This boat, which was the only one to set out with food and other necessities for the miners of the Kuskokwim, was unable to complete her journey because of heavy storms which drove her into Seward, Alaska, for shelter. The prospects of getting relief to these people, it is said, are slim as it is believed to be too late for another vessel to make the trip.

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Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

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Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to \$11,486,167.45 for gold mining companies, and \$70,821,829.34 for silver mining companies, or a total of \$82,307,996.79.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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DEPARTMENT OF MINES

HON. MARTIN BURRELL, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke.

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

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Mine & Smelter Supply Co.
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ground—**
Northern Canada Supply Co.
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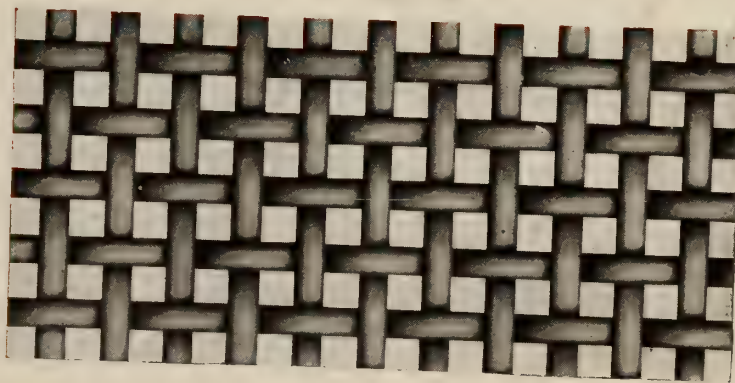
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CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO

No. 22



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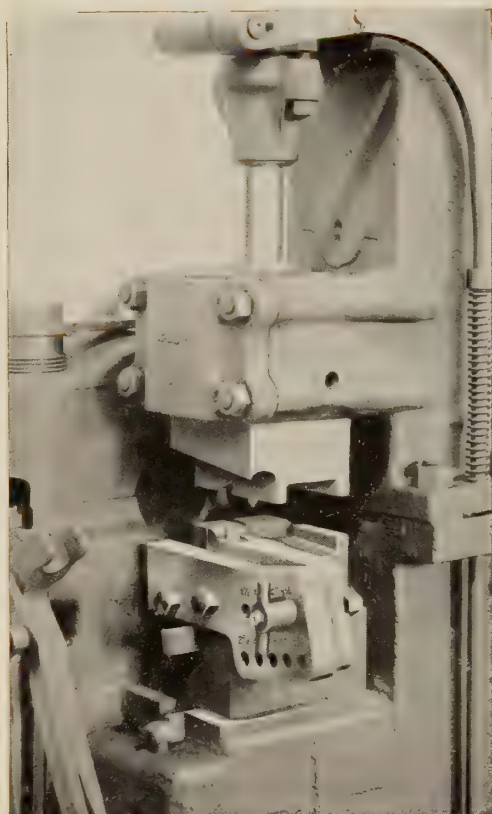
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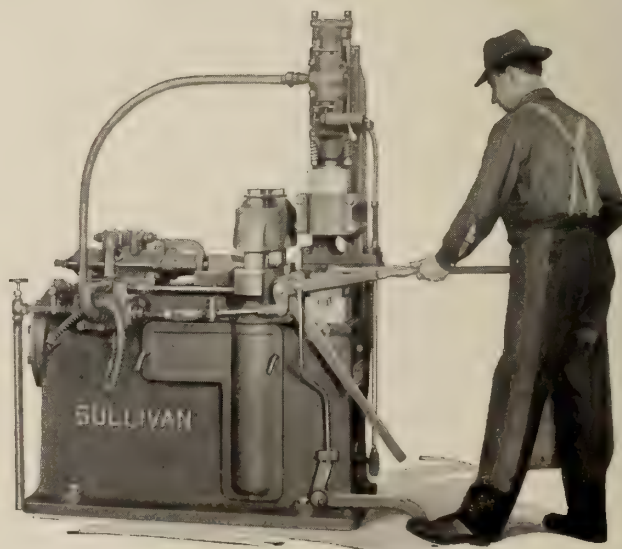
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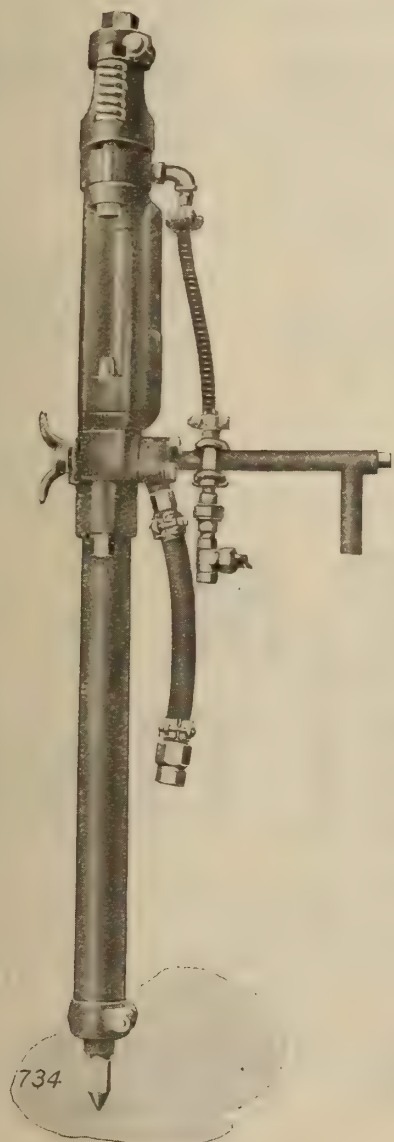
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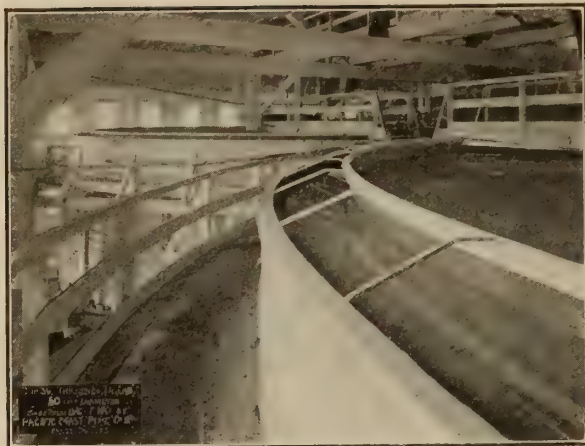
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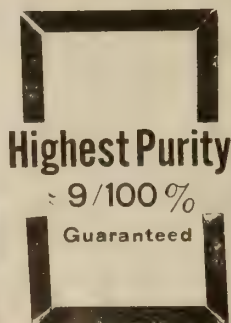
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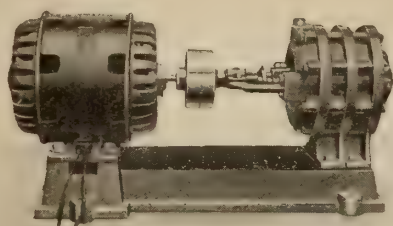


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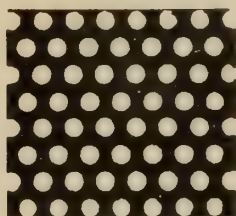
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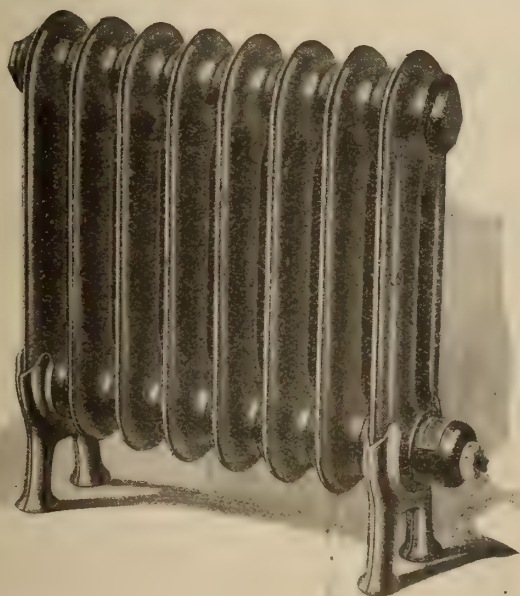
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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Engineering Office:
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or through

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No. 22

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ASSISTANCE TO GOLD MINING.

The British Government is said to have appointed a Royal Commission to report on "The War's Effect on Gold Production in the British Empire." The commission is composed of four members with Lord Inchcape as its chairman, while Mr. William Frecheville is its technical advisor. Dr. W. G. Miller represents Canada.

Mr. Frecheville is one of the foremost mining engineers in London, and at the same time one of Great Britain's most public spirited citizens. A few years ago he gave up a large and lucrative private practice to assume the onerous duties of Dean of the Mining School in the Imperial College of Science in order to put that school on a higher educational plane, and assist in educating the young engineers of the Mother Country. The people of Canada may feel the utmost confidence in leaving their case for any possible assistance to gold mining in Mr. Frecheville's hands. He knows the gold mining industry of Canada thoroughly. He has visited the country himself on several occasions, and he is also one of the directors of the Anglo-French Exploration Company, which has an interest in the Hollinger and other mines in the country, and whose representative, Mr. J. B. Tyrrell, keeps him, along with the other directors of the company, thoroughly informed on our mining situation.

DEVELOPMENT OF MINERAL RESOURCES WILL NOW BE SPEEDED UP.

Those who are engaged in developing our mineral resources have busy days ahead of them. The rapid development of our mineral deposits is now necessary and will soon be possible. The world is crying for our raw materials. Canada's mines have done well during the war in spite of shortage of labor and high cost of supplies, and they will soon be in position to greatly increase production and add materially to the wealth of the nation.

During 1917 Canada produced minerals and metals valued at \$192,982,837. This great production was obtained under conditions that made operation very difficult. Many of our best miners have been fighting in France. There has been a shortage of machinery and supplies. The demand for raw materials is now greater than ever before, and with men, machinery and supplies available our production is bound to increase.

The effect of the coming of peace has already been interpreted by the stock exchanges. Munitions manufacture must now give way to the production of basic necessities. Construction and the repairing of badly worn equipment will call for enormous quantities of minerals and metals. With more men and machinery available, and with less costly supplies, the Canadian mining and metallurgical industries must grow rapidly in the next few years.

While the consumption of the common metals, iron, lead and zinc, is sure to be large for reconstruction purposes, as it has for munitions manufacture, there also will be great demand for the precious metals. Our gold mining industry, which has stood the severe test of war in a very remarkable way, is certain to take giant steps forward in the coming year. That our gold mining companies have been able to operate at all during the past two years has been surprising to many of us. An industry which has lived through such trying times cannot but develop very rapidly now.

Silver has fortunately commanded a price which made possible the profitable operation of the Cobalt silver mines in spite of high costs. The demand for silver continues good and it is unlikely that silver will be cheap again for many years. The Cobalt silver mines have never had large reserves developed, but they continue to show up well on development. Much of the ore has been mined, but the end of silver mining at Cobalt is still far away.

The Sudbury nickel-copper mines and smelters have been very busy during the war and will continue so. Nickel refining on a large scale in Canada has just begun. Nickel, so useful in the manufacture of munitions, will be in great demand for the manufacture of nickel steel for peaceful trades. Copper also will be needed and there is a great scarcity of platinum and palladium which occur in the Sudbury nickel-copper ores.

It is reasonable to expect that the refinery at Port Colborne will soon be enlarged so that all the matte

produced by the International Nickel Co. will be refined in Canada. We should also look forward to the recovery in Canada of all the precious metals which are mined with the nickel. There is also now under construction a refinery for the British America Nickel Company which is developing the Murray mine.

Northern Manitoba has during the war become an important producer of copper. Under serious handicaps several thousand tons of rich ore has been mined and shipped from Schist Lake. A large deposit of sulphide ore at Flin Flon Lake has been discovered and explored by drilling. Several gold deposits have been found. Northern Manitoba is sure to attract much attention from mining men now that peace is near.

In Quebec great changes have been brought about in the asbestos industry by the war. Formerly much of the asbestos went to Europe, and the production naturally fell off when the war began. A larger market in the United States has been developed and larger quantities than ever will be used both in the United States and Europe.

In the Prairie Provinces the coal shortage has resulted in greater production and consumption of Canadian coal. The immediate result has been greater activity at the Alberta coal mines. The market for Alberta coal has been considerably enlarged and the coal mining companies will be permanently benefitted by the greater utilization of local fuel.

In British Columbia gold mining has naturally suffered severely. This industry will be greatly benefitted by the return of peace conditions. The war has hastened the establishment of zinc and copper refineries. The search for "war minerals" has resulted in the direction of attention to many idle properties. Greater activity in prospecting and development of the mineral areas of British Columbia is confidently expected.

In Nova Scotia the coal mines have been handicapped by shortage of men and inadequate transportation. With men and ships available the Nova Scotia mines will greatly increase production. The great activity in the iron and steel industry will continue war or peace. This will require larger supplies of ore, fuel and fluxes. Mining in Nova Scotia and Newfoundland must therefore be increased to supply the needs of the province. Mining of coal to supply the Maritime Provinces, the Atlantic States and for coaling ships will also be necessary.

THE EMPIRE'S MINERAL RESOURCES.

The Imperial Institute, in continuation of its publications with reference to the Mineral Resources of the Empire, has now issued a map with diagrams indicating the sources within the Empire of the chief metals of commercial importance. The outline map shows the occurrence in each British country of important metallic ores, and also the existence of deposits at present unworked. The diagrams attached to the map give for 1915 the production of each country as well as the total British output and the world's output of each important metal or ore.

Among the striking features disclosed are that in the case of gold more than half the total production is within the Empire, the principal producer being South Africa. With silver the British proportion is rather less than one-fifth, the principal producer being Canada. In the cases of manganese, chromium, tin and molybdenum the

British proportion is near one-half. It is remarkable that there appears to be scarcely any production of the valuable metals mercury and platinum within the Empire, so that we are almost entirely dependent on foreign countries for supplies. In the case of nickel, and cobalt Canada produces most of the world's supply.

This publication should prove of great general interest apart from its importance to those specially concerned in mining operations and should be of considerable value for educational purposes.

The map, which is folded and mounted on linen, has been prepared with the advice of the Mineral Resources Committee of the Imperial Institute, of which the late Lord Rhondda was chairman at the time of his death. The map with diagrams has been placed on sale at a price of 5s. 6d. post free.

The data used are for 1915. At present Canada is producing much larger quantities of molybdenite and chromite than in 1915. Canada also produces a very considerable quantity of platinum and palladium.

CORRESPONDENCE

Proposed Changes in Mining Act.

To the Editor of the CANADIAN MINING JOURNAL:

Sir,—I noticed in your publication of October 15th, a statement by Mr. Godson, that there is a growing sentiment throughout the country in favor of the elimination of the existing system of issuing Crown Grants of mineral claims to parties who comply with the requirements as to development, etc., and the inauguration in its stead, of a system whereunder the government would retain perpetual ownership of their mineral lands, only granting leaseholds on liberal terms, with a penalty of forfeiture if the terms are not complied with.

In the spring of 1918, at the mining convention, held in this city, a number of resolutions suggesting changes in the Mining Act were unanimously passed by a large number of mining engineers and prospectors who attended the convention. One of the most important changes suggested as being beneficial to this and other mining divisions, was exactly the opposite to Mr. Godson's statement, i.e.—to abandon the lease system and grant patents instead, for the following reasons. "Uncertainty of tenure of leases and Licenses of Occupation, subject to regulations which may be altered from time to time by Orders-in-Council, or may be cancelled or revoked, render them too hazardous a proposition for capital to entertain, and the mining industry is entirely dependent on securing capital for its development."

It is further the opinion of this Board, that the above reasons are amply justified by the many years experience that the members of the mining committee have had in this district, and other parts of the provinces. For example—a mining company might go to very heavy expense in development, mines buildings, machinery, etc., and if a term of lean years in the market came along, they would be forced, under the lease system, to operate at a very heavy loss or the lease would be automatically cancelled and many thousands of dollars of development and mine equipment would be completely thrown away, or at best the mine equipment would have to be scrapped and sold at a great loss.

It is true that the lease system is applied to many iron mines in the United States after Patents to owners are issued; but the length of lease invariably extends over a very considerable period of time ranging from 25 to 50 years, also the minimum shipments are made so low that a mining company could tide over several lean years on paying their advance royalties and mining the ores when the market improved.

But the important point of all is that it would absolutely discourage exploration. What explorer could afford to

take out a lease from the government and start mining, or fulfil the requirements of a government lease while endeavoring to make a sale of his claims? It is a hard enough struggle under normal conditions to fulfil the requirements of the Ontario Act and secure a Patent. Many claims revert to the Crown owing to the inability to comply with these conditions, as the claim is automatically cancelled, even if the full three years assessment work has been complied with, if the prospector has been unable to raise the necessary cash to make a survey and pay the required government price for the land. It frequently happens that even after securing his Patent, he is forced to carry these lands for years before making a sale. To do this under a lease and forfeiture system would be simply impossible.

In British Columbia, the terms and conditions of working clauses to be complied with are much easier, and we must not forget that the development of the entire mining district is dependent on the explorer who works faithfully season after season, only too frequently to see his hopes of a title depart from him. It must be remembered that if it rested with the average mining company to employ the great number of explorers who spend their lives searching over our great northern territory, the amount of work done along that line would be tremendously lessened, also that the mining company is just as dependent on the labors of the explorer as the explorer, on the capital of the mining company.

In the opinion of this Board, nothing would be more detrimental to the development of the mining interests of this country than the passing of such a measure.

Yours, etc.,

Jos. Z. FINZEL,

Secretary Port Arthur Board of Trade.

Port Arthur, Nov. 6th, 1918.

PROPOSED AMENDMENTS TO THE MINING ACT.

Following is a copy of proposed amendments passed at the convention:

1. That the Recorder of a Mining Division have the power to issue a Special Renewal License. (Under the present terms of the Act, considerable delay occurs by having to submit the matter to the commissioner, which would be obviated by vesting that power with the Recorder. This delay is at a season of the year that can be ill afforded by the prospector.)
2. That Orders-in-Council affecting mining claims and regulations under the Mining Act be published in at least one newspaper in the district affected, in order to inform prospectors and others interested. (Unless the prospector visit the Recorder's office he has no opportunity of becoming advised of such Orders-in-Council and this may result in undue hardship.)
3. That Patents be issued for claims or parts of claims covered by water, where it can be shown that the granting of such Patent will not interfere with navigation.
4. That in Crown Forest Reserves and Timber Berths where prospecting is permitted, Patents instead of leases be granted for mining locations, subject to such reservations as may be deemed advisable. (The uncertainty of tenure of Leases and Licenses of Occupation, the fact that they are subject to regulations which may be altered from time to time by Orders-in-Council, or may be cancelled or revoked, render them too hazardous a proposition for capital to entertain, and the mining industry is entirely dependent on securing capital for its development.)
5. That the Assessment Work consist of \$100 worth of actual mining work per 40 acre location per year, for a period of three years, when a Patent shall issue at the usual price per acre.
6. That the Assessment Work may include cost of survey, not to exceed \$100 per location, and in the case of an iron location, may include a magnetic survey.

(The condition of the labor market, the increase in wages, cost of materials and living, which have all more than doubled since the present Act came into force, make it desirable that Assessment Work should be on a fixed basis of value and not dependent on variable factors. By including the cost of survey in the Assessment Work, the tendency would be to have this performed at an earlier period in the development of the location than obtains at present and would thus avoid many difficulties and disputes as to boundaries, besides reducing the total cost to the prospector. In case the of iron locations more practical benefit would result in many cases from a magnetic survey than any surface trenching. Under the present conditions, the total cost to the prospector of Assessment Work, Survey, Purchase Price, License and Recording, is a minimum of \$70 per acre, which is prohibitive on all but bonanza ores. The proposed amendments would reduce this to about \$10 per acre which is reasonably high enough considering the hazardous nature of mining operations.)

7. Sub-Clause to (7) Sect. 78. That in the case of claims taken up for iron and iron pyrites, the Assessment Work may be applied on one or more of 10 contiguous claims. (Prospecting for iron and iron pyrites involves exploratory work distributed over large areas of promising formation, in which a concentration of merchantable ore may only be expected under favorable conditions. In most cases these can only be determined by extensive diamond drilling, involving an outlay that should be applicable as Assessment Work over a larger number of contiguous claims than obtains with other ores.)

8. That the unorganized portion of the Fort Frances Mining Division be administered by the Mining Recorder at Port Arthur. (At present the Mining Recorder's office at Fort Frances is closed. This necessitates the forwarding of various documents to Toronto, causing delay and inconvenience, which could be obviated by administering the Division from Port Arthur.)

[OBITUARY.

C. E. Watson, Geo. Randolph, Jas. Alexander and A. B. Clabon.

Two prominent Canadian mining men were lost on Friday, the 25th October, when the Str. "Princess Sophia" foundered in Lynn Canal, while on her way south. They were Messrs. C. E. Watson and G. O. Randolph, the former being general manager of the Mining Corporation of Canada, and the latter a Cobalt mining engineer. They came to British Columbia in September and, after an inspection, acquired control of the Woolsey Silver Claims, situated on Silver Creek, near Revelstoke, B.C. This business completed they proceeded to the Atlin District to examine the Engineer Free Milling Gold property, situated on Taku Arm of Tagish Lake, and owned by Captain James Alexander. It was generally understood that their intention was to endeavor to effect an agreement with Capt. Alexander for the purchase of his mine, providing their observations satisfied them as to its possibilities. They were on their way back, accompanied by Capt. Alexander and Mrs. Alexander, when disaster overcame the vessel on which they had taken passage and all met death in the icy waters of the northern coast. Mining men are referring to the tragic coincidence in that so many of the principals in the Woolsey property deal should have been so suddenly carried off, Mr. A. B. Clabon, through whom much of the preliminary negotiations were conducted, having been killed only a short time ago by falling over a precipice at Silver Creek. Capt. Alexander also had many friends in mining circles in British Columbia. Capt. Alexander valued the Engineer Mine at \$2,000,000.

Possibilities of European Immigration After the War

By F. W. GRAY

A year or more ago there appeared in various Canadian newspapers a suggestion that Canadians should prepare for a renewal of the tide of European immigration which has been interrupted by the war. It was intimated that the cost of the war would result in such increase of taxation in European countries as would drive the peasantry and artisans to seek less onerous conditions of living and the greater political freedom of the United States and Canada. The preponderating movement of population forecasted was from Europe westward, or an accelerated continuation of that great migration which was a distinguishing characteristic of the Nineteenth Century, and out of which have arisen forces that are profoundly influencing current events. Is this forecast a correct one? There have been significant occurrences within the past few months which would indicate that it is not. The statement has been so often made that the present war is a conflict of two ideals, a conflict between autocracy and democracy, that the statement has become hackneyed and outworn, maybe, and as a writer in the October "Atlantic" states, "The original watchwords of the conflict are in danger of losing their potency as incentives after years of conflict"—but they are none the less true.

To-day we are justified in believing that the triumph of democracy is imminent, but few have realized how tremendous and world shaking are the events which will follow the actual consummation of the triumph. They may be such as even to eclipse the preliminary cataclysm and in countries such as compose the Teutonic League the birth-pangs of rule by the people through truly representative institutions may be as terrible as those which are at the present time agonizing the peoples of Russia. For, to quote again from the writer just mentioned, "When the end shall come, it will be in reality a great beginning."

That may well be, but nevertheless, nothing is more certain than the speedy replacement in Europe of all forms of autocracy and feudal survivals by representative parliamentary governments, accompanied or not—and this is really not important—by the forms of limited monarchy. While it may be hoped and prayed that Europe may be spared the extravagances and wickedness of Bolshevism, and the absurd ideas concerning property which this particular form of lunacy is attempting to propagate, it may be anticipated that the large estates of the Prussian and Magyar Junkers will be divided up amongst the peasantry, that conscription for military purposes will disappear in the consummation of a League of Nations, and that the vote will really mean something to those European peoples to whom as yet it has been nothing but a mocking of their legitimate aspirations.

All these things would seem to be the reasonable accompaniments of truly triumphant democracy, and if, and when they come to pass will not Europe be as good a country to live in as North America? And will not the main incentives to emigration from Europe have largely disappeared, at least so far as the undeveloped countries of South-Eastern Europe are concerned? This reasoning may not hold good in the case of Italy and some other countries where emigration has been forced by actual surplus population, and the lack of the basic minerals, in particular by the lack of coal, but for Russia and Siberia, for the Balkans, Poland, Hungary and Rumania, it will most certainly hold good.

There are many millions in North America who were born in the belligerent countries of Europe, and their homes, their relatives and friends have been involved in the wastage of war. For years some of these people have heard nothing of their own people, and curiosity alone,

not to mention stronger impulses will draw them to the land of their birth so soon as ocean travel on a normal scale becomes possible and permissible. The alien enemies among these present residents of North America have in most cases been enabled to earn large wages, but they have been precluded from sending to Europe the remittances that they were accustomed to send before the war. Enquiry from the large steamship companies will probably disclose the fact that steamer tickets have already been spoken for by thousands of natives of Europe now in North America who for one reason or another wish to revisit the scenes of their youth, or what remains of them. The money these people have is currency which has suffered no depreciation in value, nor is likely to, and it is evident that Europe, purged of its militaristic wrongs and restored to the rule of the people, with years of assured peace ahead, will offer many attractions to the returned emigrant with good money in his pocket.

The great wastage of life caused by the war must also exercise a deterrent effect on emigration from Europe, at least for a time, but probably this will be one of the least important of the factors in the long run.

Summarising the foregoing possibilities, does it not seem that there is a fair probability that the tide of migration may for a period set eastwards, from North America to Europe? That is to say so far as the countries are concerned with which we are to-day at war.

But when one comes to consider the question of British emigration, a different aspect is presented.

The war has unified and compacted the British Empire in a wonderful manner. The Australian has met, and in many cases married, his English cousin; the Canadian has visited and been joyfully received by his relatives in Scotland, maybe. The average Englishman whose foreign travel was limited to a Cook's tour to Switzerland has seen the Pyramids and travelled the Euphrates from the Persian Gulf to ancient Bagdad. No more can the present generation of the British be regarded as stay-at-homes, and the vision of the British people to-day in every place where the flag floats,—and they were never so many nor so scattered—is as wide and as keenly adventurous as it was in the heyday of the Elizabethan age. Many hundred of thousands of British young men, when demobilization takes place, will once again tread the familiar decks of a transport, her camouflage changed for peace-paint, bound for Canada, Australia, New Zealand, for augmented British Africa, and for the thousand and one places where our soldiers will resume the work of peace times. The complexities of the interchange of population which will take place between the British Isles and the rest of the Empire cannot be foreseen, or even guessed at, but there can be little doubt that here in Canada we shall receive an influx of British immigrants of large proportions.

If then there should occur simultaneously an efflux of the more distinctly "foreign" nationalities from Canada and the United States and an influx of British born, will it not radically, and permanently maybe, change the labor situation, and have far-reaching effects on rates of wages, hours of labor and labor politics generally? It would appear quite probable.

The effect on the mining industry will be very considerable. In the past the mining industry has depended very largely for labor supply on the newly arrived European immigrant, particularly for the more arduous and less highly paid occupations. This is probably more true of the great mining centres of the United States than it is of Canada, but we also were heading in the same direction before the war.

The British born immigrant will not adapt himself to the conditions of a common laborer, nor will he accept the conditions of living and the rate and hours of wages which have been common among "foreign" labor in mining camps—or at least were common before the war. It is not necessary to point out the changes in mine operation and in the costs of mining which must follow a reversal of labor supply such as is herein indicated. In short, common labor is to-day decidedly scarce, but it would look as if it were going to be much scarcer after peace has been arranged and demobilization has taken place.

It may be anticipated that the necessity will bring forward some remedies, and one direction in which advances may be expected is a more extended use of mechanical appliances in mining operations. Hard manual labor will in the future be much more at a discount than it is to-day, and if men can achieve results by the substitution of machinery is it not progress? Mine managers and the directors of large mining operations will be well advised to investigate every possible method of substituting mechanical devices for manual labor. It is not altogether that **cheap** manual labor is a disappearing thing. It is the actual labor supply itself that is diminishing and promises still more to diminish.

The effect of after-war conditions on coal mining in Canada would seem to be the most important of all.

Coal, as the world is now realizing, is the basic factor in industry and civilization. Shortage of coal supply, or excessively costly coal, will throttle and depress all other industry. As everybody knows, the man-power at Canadian collieries is to-day so reduced that proper outputs are not possible. But what is more serious, there appears to be no source from which the man power at the coal mines can be replenished, either during the war, or after. Only a small proportion of those miners who went to the front will return to work in the collieries. A great many are dead, many others are so wounded that they will not be able to take up coal mining again, but a far greater number will seek other avenues of employment. Notwithstanding the short hours and the comparatively large wages earned by underground workers, it is not popular employment, nor is it employment that is being followed by the sons of miners. Canada offers too many varieties of endeavor to favor the formation of a mining class—almost a caste—such as is to be found in Great Britain and in the coal fields of Europe. It has for many years been increasingly evident in Nova Scotia that the only source of labor supply for the collieries is Europe, and if that is cut off, production must decline.

Apart from the suicidal policy of curtailing coal production in war times, this feature of the Nova Scotian coal industry is one which would have advised the retention of the coal-miners in the industry. Fewer more flagrant examples of dissipation of war effort have occurred than the hand-picked enlistment of Nova Scotian miners, but the consequences of the mistake in recruiting which occurred in Nova Scotia will extend far beyond the period of the war, and will for years to come be a deterrent to the progress of the Province. No reflection is here intended upon the miners, hundreds of whom have died for their country. Braver men never stood in shoe leather than the colliers of Nova Scotia, but they would have been of far more service to the cause had those who directed the affairs of Canada counselled and allowed them to remain at home and dig coal.

To sum up the foregoing; if our reasoning is approximately correct, it would seem as if the after war possibilities in Canada will include a decided shortage of "common" or "foreign" labor, an influx of British born to whom laboring work will not appeal, accompanied by a continuation of a demand for coal which will be greater than the available labor supply will make it possible to

produce. Prophecy is not a pursuit to be recommended or indulged in in times when almost every prediction made has been falsified by events, but intelligent anticipation of the future may prove of profit if it enables us to prepare solutions of the problems of the future. Students of reconstruction after the war are invited to give consideration to the possibilities mentioned above, and some actual enquiry of sources which are in touch with immigration matters might prove useful to those who employ large bodies of men in mining operations.

BRITISH COLUMBIA MINES DEPARTMENT WILL PROSPECT CLAIMS.

The Snowstorm Group, which comprises five highly mineralized copper-silver-gold claims situated in Highland Valley, Yale District, will be prospected by the Provincial Department of Mines by diamond drilling under the terms of the Mineral Survey and Development Act.

Announcement to this effect has been made by Hon. Wm. Sloan, Minister of Mines, and tenders are being invited for 10,000 lineal feet of drilling, more or less, thus allowing ample margin for the definite proving, or otherwise, of the ore body which, it is generally believed, exists.

Before deciding on this step Mr. Sloan has had the property inspected and reported upon by the best engineering authority. Among those who have expressed the opinion that the Snowstorm Group is a good prospect and likely to prove a valuable asset to the Province, with further development are R. W. Thomson and P. B. Freeland, resident engineers with headquarters respectively at Kamloops and Grand Forks. Their views are supported by Mr. Wm. Brewer, now resident engineer, Nanaimo, B.C., whose report on this property appears in the 1915 report of the British Columbia Minister of Mines and the late Dr. C. W. Drysdale, formerly of the Geological Survey Branch, Ottawa, who did considerable survey work in this Province, and who held a very favorable opinion of the mineral zone in which the claims in question are situated.

Mr. Brewer, in 1915, states that, after an examination of the Highland Valley Camp, his conclusions were that "while there is considerable tonnage of high grade bornite and chalcocite copper ore on several of the mineral claims, yet that the future growth and prosperity of the camp will eventually centre around the apparently extensive bodies of low grade copper ore. To systematically and thoroughly prospect and develop these deposits, diamond-drill boring would appear to offer more advantages than the slower and more expensive method of opening up the mineral-bearing zones by working openings."

It is Mr. Sloan's hope that the diamond drill which he has authorized will result in proving a large and rich mineral area which has been lying idle for years, and that the direct outcome will be an important addition to the shipping mines of British Columbia.

Asked whether any action had been taken by the Department of Mines towards the diamond drilling of any of the iron ore deposits of the Province, Mr. Sloan said that he expected to be in a position shortly to call for tenders for the drilling of one or more such properties.

The West Kootenay Power & Light Co., of British Columbia, has ordered 800,000 lb. of copper cable and other material from manufacturers in Hamilton, Ont. This is sufficient for 300 miles of line and will be used chiefly in extending the circuit from Greenwood, B.C., to Copper Mountain, to furnish power for the operations of the B. C. Copper Mining Co. at that point. This work, it is stated, will be completed by July, 1919.

THE ROMANCE OF THE YUKON.

The romance of the Yukon was never better illustrated than in the career of Mr. William Scouse, one of the 343 lost on the morning of the 25th of October, when the Str. "Princess Sophia," one of the vessels of the Canadian Pacific Steamship Co., having struck a reef in Lynn Canal while en route south, sank and carried all her passengers and crew to an untimely end. Mr. Scouse was one of the real "Sourdoughs," whose ranks are fast thinning. It was he who raised the first bucket of "pay" on the famous Eldorado Creek.

It was in February, 1896, before the days when the finding of the gold made the Klondyke a household word throughout America, that four young men of Nanaimo, B.C., impelled by a spirit of adventure, decided to set out on a trip through the Northland. They were William Scouse, William Sloan, Jack Wilkinson, known by the sobriquet of "Big Jack" to the miners of Nanaimo, and Thomas Flack.

"Our idea was to prospect the country," explained Mr. Sloan in recalling the circumstances of the expedition, "but I think that what was even more prominently before our eyes was that we would see the vast and mysterious northern lands of which so little was known in those days."

The little party took passage by the old Str. "Willapa," and outfitted at Juneau from where they hit the trail into the interior, passing over the Chilcoot Pass, where a few years later, when the historic trek to the Klondyke started so many were to give up their lives, into the Stewart River Country.

For the greater part of the summer they prospected without success. Running short of supplies they decided to work into the Yukon, where, just at that time, excitement ran high over the discovery of rich deposits on Bonanza Creek. They reached this creek too late—all the ground had been staked. This turned them aside to Whipple Creek, later to be known the world over as the Eldorado. On September 7th, 1896, Mr. Scouse staked No. 14 and Mr. Sloan No. 15, Eldorado, while Mr. Wilkinson recorded No. 25, Adams Creek; Mr. Flack No. 32, Bonanza; and others were staked on Hunker Creek.

When the four left Nanaimo it was understood that they were equal partners in anything that was found, and to this agreement they held throughout. Their joint efforts were generously rewarded, each leaving the Yukon with a substantial fortune.

Having made their records, it was decided that the Eldorado prospects should first be developed and a small but comfortable cabin was built close to the claims. The lumber for the cabin's floor was whipsawed, Messrs. Wilkinson and Sloan doing the whipsawing which was required for all operations at that time. Mr. Sloan, in this connection, remembers that, with "Big Jack" on one end of the saw he had to "go some."

In discussing these early days, Mr. Sloan says, that the reports that his partner, the late Mr. Scouse, hoisted the first "pay" dirt on the Eldorado is quite correct. He recollects the circumstances quite clearly. "I was the boss carpenter," Mr. Sloan recalled with a smile, "and thus it fell to my lot to make the first windlass and bucket for the prospecting of the first shaft on the Creek. There was some argument as to the required size of the drum and the bucket. When they had been constructed I gave them their first trial and raised the first dirt, which then was without pay, on the Eldorado."

While Sloan and Flack were hauling supplies to their claims from the Klondyke River, word reached them that the first "pay" dirt had been raised on their property.

At the time they were on their way to the Creek and, meeting Alex. Orr, a miner with claims above theirs on the Eldorado, he told them that Scouse and Wilkinson had reached bed-rock and that Scouse, with Wilkinson in the shaft, had brought the first gold to the surface, there being \$57 to the bucket.

In sinking the shaft the character of the ground was watched with interest and carefully prospected, but the results were disappointing all the way down. When the gravel was thawed out it was found, Mr. Sloan explains, to be a loose light wash. About 20 feet down a pile of drift wood was encountered and it was not until after this had been passed that hard tight wash was reached, this being only a short distance from bed-rock. While there was exceptionally good pay at bed-rock on this shaft the main pay was found in cross-cutting to a second shaft. Mr. Sloan states that before the claims were thus proved the partnership was "stony broke" so that the day that the first gold was hoisted saw them step from a condition of poverty to one of comparative affluence.

While luck was with the Nanaimo men, other miners were not so favored by the Goddess of Chance. It was the old story of a thousand gold fields. Some made good and others failed. Some were brought within easy reach of fortunes only to be turned aside by the whims of chance. This was the case, Mr. Sloan narrated, with Jack Kool and French Pete, partners in the great game of gold hunting. They could have staked Claims 16 and 17, next to the Scouse-Sloan, et al, combination, the former of which turned out to be the richest of the Yukon. They, however, did not like the looks of the Creek at that point and left to take up Nos. 26 and 27, Adams Creek. The latter did not pan out and later on the two returned and worked for wages for the Nanaimo partnership. No. 16, Eldorado was staked later by Con Van Alsteine, who had been prospecting near Messrs. Scouse, Flack, Wilkinson and Sloan in the Stewart River Country that summer. Van Alsteine traded No. 16 to Mr. T. S. Lippy, who had staked No. 37 on the same creek, and it was thus that Mr. Lippy came to be possessed of the wealth of one of the most productive pieces of ground in the Yukon. Van Alsteine, it was recalled by Mr. Sloan, sold No. 37 for a good figure. Going to New York he lost his money in a matrimonial venture, his bride, to whom he had entrusted his "roll" deserting him as they boarded a steamer which was to take them to Europe on a honeymoon.

A human interest touch is given this story of the Yukon by the fact that the four Nanaimo men, when they separated after their success, agreed that on the twenty-fifth anniversary of the Eldorado strike they would meet again, all being alive, to celebrate and to live again in reminiscence the days of their pioneering. The pact provided that they would come together on that date no matter how far anyone of the four might have to travel. Mr. Scouse's death makes the first break in the partnership.

"The last time I saw Scouse he referred to our reunion," observed Mr. Sloan, "Now he is gone. He was a man of the utmost integrity, a genial companion and a thorough gentleman in every respect. We four worked harmoniously together for some years; there was never the scratch of a pen in our dealings together and when we finally dissolved the partnership and dispersed, there remained an enduring friendship which has continued through the years. I know the other members of the partnership, Messrs. Flack and Wilkinson, will feel keenly, as I do, the untimely and sad fate of our old friend, William Scouse."

Mr. Wilkinson is now retired and living near New-castle-on-Tyne and Mr. Flack at present is living in Chicago, Ill.

MINERS' STRIKE CAUSES LOWER COAL OUTPUT.

The total production of coal for the Province of British Columbia for the month of September was 164,460 tons, or a decrease of 75,777 tons as compared to the August output. This is the first month of this year that has shown a decline, and it is to be explained to a large extent by the month's strike of the miners of the Fernie and Michel Collieries in the Crow's Nest Pass Field. This is responsible for a loss of at least 50,000 tons, the August return from these mines being 78,971 tons as against 17,784 tons for the month under review. There also should be taken into consideration Labor Day, five Sundays, and a thirty-day month, as well as the Nanaimo accident, in which some sixteen miners were lost when the hoisting cable in No. 1 Shaft, Protection, Western Fuel Co., broke and let a descending cage fall.

The tonnages produced by the various districts follows:

	Tons
Vancouver Island.....	131,695
Crows' Nest Pass.....	17,784
Nicola Princeton.....	14,831
Northern Area (the first record from this field)	150

164,460

The tonnage produced by the various mining companies follows:

Vancouver Island.

	Tons
Canadian Collieries (D), Ltd.....	67,156
Canadian Western Fuel Co.....	50,858
Pacific Coast Coal Mines.....	5,581
B. C. Coal Mining Co. (Jingle Pot).....	3,273
Granby Mining & Smelting Co.....	2,327
Nanoose Collieries.....	2,500

131,695

Crow's Nest Pass Field.

	Tons
Crow's Nest Pass Coal Colliery:	
Coal Creek Colliery.....	3,224
Michel Colliery.....	1,399
Corbin Coal and Coke Co.....	13,161

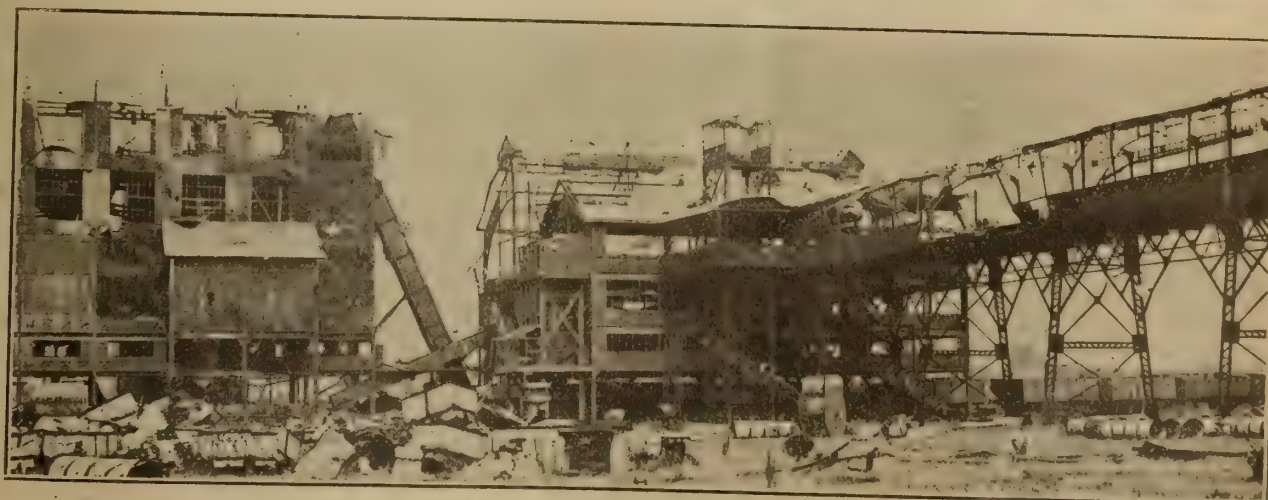
17,784

Nicola-Princeton Field.

	Tons
Middlesboro Collieries (Merritt, B.C.).....	8,327
Fleming Coal Co. (Merritt, B.C.).....	2,743
Coalmont Colliery (Coalmont, B.C.).....	748
Princeton Colliery (Princeton, B.C.).....	3,013

14,831

For the purpose of facilitating the equal distribution of anthracite coal in Canada during the winter a further Order-in-Council has been passed by the Dominion Government at the instance of Fuel Controller C. A. Magrath. The regulations contained in this order are designed to prevent disproportionate deliveries of anthracite to large consumers at times when the householder cannot be supplied, the fuel controller being given the right to prohibit entirely, or to limit in any manner he may deem advisable, the use of anthracite coal in any building. This does not apply to private houses using less than 40 tons of coal annually. This law will be enforced through the fuel administrators of the various districts or, in the event of there being no such official, direct from Ottawa by the fuel controller. Infractions of the ruling may be punished by heavy penalties.



SOME SAMPLES OF WRECKAGE IN THE COAL MINING DISTRICTS.

—Canadian Official Photograph.

DRILLING FOR COAL ON EAST COAST, VANCOUVER ISLAND.

New coal mine development of an important character has commenced on Vancouver Island, British Columbia. The measures known to exist on the East Coast near the town of Chemainus are being explored by means of diamond drill and those in the best position to hazard a forecast do not hesitate to predict that the results will be satisfactory as far as the quality and quantity of the coal, the existence of which is to be definitely established, are concerned. Mr. H. W. Treat, of Seattle, Wn., is the party best known in connection with these steps to develop this latent natural resource, but, according to newspaper statements and common report, he has behind him the capital of the Samuel Hill interests of the United States. If this is so it is generally believed that the coal industry of this section is likely, in the near future, to experience a very material growth.

The drills in question are being sunk near the foreshore at Chemainus, at which point Mr. Treat has secured some provincial leases and options on some Crown Granted Lands. Incidentally Mr. Treat, whose energies have been devoted to the Island for some months, has obtained options on coal bearing lands of the district. But in this particular section the drilling is being pushed forward expeditiously under the supervision of Mr. John Hamilton, who had charge of similar work for the Granby Consolidated Mining & Smelting Company, when that company was opening its coal mines at Cassidy's, Vancouver Island. The prospects for the establishment of another large colliery in this part of British Columbia, therefore, are bright and residents are looking forward to it with gratification.

An account of what led up to the present situation is interesting. When the E. & N. Railway Company obtained its land grant as a subsidy for the construction of the road the Dominion Government, besides giving it all the mineral rights within the limits of the belt with the exception of that of gold and silver, also gave it the right to mine "in and under the seas." The Government, however, was doubtful, apparently, as to whether it had the power to extend any such exclusive privilege to any company or individual. For that reason the qualification was inserted that this applied only if Parliament had the authority necessary under the British North America Act. This was the position when Mr. Treat and his associates cast their eyes on the East coast foreshores of Vancouver Island and visualized the immense deposits of coal which lay beneath the protected waters of its bays and estuaries. With the demand for coal the world over increasing and the price soaring it was decided that the point as to whether these rights were open or whether they were the exclusive property of the E. & N. Railway company should be brought to an issue. As was anticipated, no doubt, the plans of Mr. Treat had not proceeded far before legal proceedings were instituted by the company, and since then, up to a short time ago, the matter had been before the courts of the land. The result, as may be judged by the fact that development operations are proceeding, was that the position that the E. & N. Railway Company cannot claim exclusive foreshore privileges has been upheld, although, it is not improbable that the litigation will be carried as far as the Privy Council as the dispute is one of the highest importance, involving title, if the opinion of geologists is to be given any credence, to considerable coal deposits.

It is possible to get some idea of the coal wealth of the foreshores of the East coast of Vancouver Island, from Cowichan Bay to Nanaimo, a distance of between forty and fifty miles, and even further north, by contemplating the property of the Canadian Western Fuel Company at Nanaimo and its production. This company's

chief output comes from No. 1 mine, and its workings are under water. It acquired title to this, before the railway company got its land grant, from the Hudson's Bay Company, which, of course, was the pioneer concern in the opening up of Western Canada, as it was in the exploitation of the natural wealth of the whole of the Dominion of Canada.

GOLD PRODUCING POSSIBILITIES OF THE CARIBOO DISTRICT.

The gold producing possibilities of the famous Cariboo District of British Columbia, which already has to its credit a gold output aggregating \$65,000,000, is the subject of an interesting report by Mr. B. B. McKay, of the British Columbia Branch of the Dominion Geological Survey. Mr. McKay, who has spent considerable of the summer in that district, states that, notwithstanding the heavy increase in the cost of mining operations and the comparatively low, or standard price of gold, production is going on steadily. He predicts that in many parts of the country there will be much gold recovered, but does not look for this development until after the war, when more labor becomes available. With men looking for employment, and equipment cheaper and more readily secured, he declares that the ground will be made to yield richly. The use of hydraulicking, dredging, drag-line scraping, etc., makes this possible, where, in the old days, it would have been considered impracticable. Lack of transportation facilities, he says, is holding back development, there being areas in the vicinity of Keithley and Harvey Creeks which lack even the roughest of wagon roads.

The installation of the new plant in preparation for winter operations is occupying the attention of the management of the Delta Copper Co., Ltd. This property is situated on Rocher deBoule Mountain, Skeena District. Latest reports are to the effect that on the east end of the claims, and at an elevation of 6,250 feet a body of ore already is blocked out on the upper vein.



—Canadian Official Photograph.
Boring for water in a Canadian camp in France.

A. G. LANGLEY WILL REPRESENT BRITISH COLUMBIA IN SMELTER INQUIRY.

Mr. A. G. Langley, Provincial Resident Mining Engineer, with headquarters at Revelstoke, B.C., has been appointed to represent the Provincial Government at the pending inquiry into the justice or injustice of the rates charged by the Consolidated Mining & Smelting Co. of Canada, for the treatment of custom ores at the Trail (B.C.) Smeltery. This appointment is the result of a debate which took place in the British Columbia Legislature at its last session, the matter being introduced by members from the Boundary District, in which section are situated the majority of the shipping mines the owners of which are dissatisfied with conditions. The debate led to the passage of a resolution introduced by Hon. Wm. Sloan, Minister of Mines, to the effect that the Provincial Government should be represented at the proposed investigation and that, if the evidence adduced indicated that the mine operators were being unjustly treated, the whole question would be made the subject of a searching inquiry by a Royal Commission appointed by the Government of British Columbia and empowered to submit recommendations for the removal of the cause of protest and for the permanent and satisfactory adjustment of the smelter question in the Province. Mr. Langley therefore will attend each of the sessions of the Committee which now has the matter in hand, the members of which are Messrs. deLashmutter, Fowler and Anderson, and will report to the Minister of Mines. The first meeting of the Committee was to have been held on the 31st of October, at Nelson, B.C., but owing to the regulations prohibiting public gatherings of any kind, because of the prevalence of Spanish Influenza, an indefinite postponement has been announced.

ANOTHER WAGE INCREASE FOR COAL MINERS.

Another wage increase has been granted the coal miners of Vancouver Island, B.C., according to an announcement made on October 24th. The request for this advance has been before the authorities for some weeks, and it was felt that the delay in reaching a decision might have the effect of causing labor trouble of a serious character. Certainly such an outcome was threatened. The acquiescence of the government officials and of the operators, however, has resulted in quieting all murmurs of dissatisfaction. Final decision was reached at a meeting between Mr. J. Bulger, representing the Fair Wage Officer of the Dominion Government; Mr. Nichol Thompson, representing the Fuel Controller; and a number of British Columbia members of the Dominion House of Commons. The extent of the raise is 75 cents per day, and it was agreed further that a Commission consisting of the Dominion Fair Wage Officer and representatives of the men and the companies should meet once in every three months, as is done in Eastern British Columbia and Alberta, to adjust the wage scale in its relationship to the rise or fall of cost of living. The new arrangement as to wages will date from the 1st of November, and the Commission referred to will hold its first meeting in January. Another advance in the retail cost of coal in the province is certain to follow, it being state in authoritative quarters that Fuel Controller Thompson is likely to authorize the addition of fifty cents a ton to the present selling price, the change also to date from the first day of next month.

Under the terms of a recent Order-in-Council the Canadian War Trade Board is authorized to take possession and to operate for a period of five years if, necessary, any mines or properties in Canada which are producing chrome ore, or which have produced it in the past.



BORING FOR WATER IN A CANADIAN CAMP IN FRANCE.

—Canadian Official Photograph.

MANGANESE ORE ON VANCOUVER ISLAND.

In reporting on the recent manganese ore discoveries on Vancouver Island, British Columbia, Mr. Wm. M. Brewer, resident engineer with headquarters at Nanaimo, B.C., states that the mineral deposits in question are in his opinion of very considerable importance. As, however, there has been very little development done as yet, the extent and continuity of the deposits are undetermined. Samples assayed by the Provincial Bureau of Mines, it is stated, show results of percentage of manganese in the ore varying between 15.88 and 52.60 per cent with the majority of the samples showing over 40 per cent. manganese. It is impossible, he says, to form any reliable estimate of the tonnage actually in sight, but is of the opinion that the computation of Mr. G. C. Mackenzie, Western representative of the Munition Resources Commission, of 2,000 tons immediately available may be accepted. It is further stated that the deposits of manganese occur in a belt of cherty jasperised rock which is said to be continuous from Mount Sicker to the northerly end of Cowichan Lake, a distance of some forty miles, and is included in the Mount Sicker series of rock formation. Sufficient work has not been done to determine whether the deposits of manganese ore are residual or whether they occur as replacement deposits in the jasperised rock and occupy fissures in the sheared portion of the belt of rocks. The latter theory would appear, from the conditions at present shown by the shallow work that has been done, to be the most tenable, and if such prove to be the case it is reasonable to presume that the ore deposits may possibly maintain continuity to some considerable depth, as the shearing movement appears to be widespread and deep-seated.

INCREASE IN PRICE OF COAL IN BRITISH COLUMBIA

An increase of 75 cents a ton in the selling price of coal in British Columbia was authorized by Mr. Nichol Thompson, Pacific Coast representative of the Fuel Controller, on the 1st of November. Coal for domestic uses, therefore, now costs \$9.75 a ton in this province. The further advance is the direct result of the raise of 75 cents a day in the wages of the coal miners of British Columbia which was demanded by them and granted by the officials of the Fuel Control Department a couple of weeks ago.

Vancouver City proposes to appoint a Fuel Administrator under the terms of an Order-in-Council passed by the Dominion Government authorizing both Provincial and Municipal officers to work with the Fuel Controller in fixing prices, regulating distribution and in the discharge of the many other duties of the department. Up to the present the Provincial Government has not named a Fuel Controller for this section of Canada, but Mr. Thompson is acting in the interim. It will be the duty of Vancouver's representative to protect the citizens of that City against unduly high prices and, in the event of a shortage of fuel this winter, which does not seem likely to occur, to see that the available resources are fairly allocated.

CROWS' NEST PASS COAL MINES PRODUCTION INCREASING.

When the miners of the Fernie-Michel District, Crow's Nest Pass, British Columbia, went back to work on the Single Shift System, thus having gained that for which they struck for thirty or more days, it was understood that a Royal Commission was to be appointed by the Provincial Government to investigate the men's charge that a single shift was necessary "because of the dangerous condition of the mines." It is authoritatively reported that the delay in the announcement of the personnel of this Commission is due to the men having failed to nominate their representative to its counsels. The company, it is said,

has done so and the government is prepared to take action as soon as the miners are heard from. The explanation given of the delay on the miners' part is that because of the Provincial regulations prohibiting public gatherings as a step towards stamping out the epidemic of Influenza in the West, they have been unable to assemble for the purpose of selecting one of their number to take part in the investigation. Meanwhile the work at the mines is proceeding without apparent trouble and it is satisfactory to be able to report that the re-organization following their enforced idleness is practically complete and that the output from this district may be expected to approximate normal in a very short time.

It is likely that as a result of the recent miners' strike on the coal field of the Crow's Nest Pass, British Columbia, some of those who left their work will be called to the colors under the terms of the Military Service Act of British Columbia. An appeal has been entered by the military authorities against the further exemption of twenty-four employees of the Crow's Nest Pass Collieries on the ground that they have disobeyed the order made by Judge Thompson when he allowed them exemption, it being shown at that time that they were engaged in a work of national importance. This order only permits any employee to remain idle from this essential employment twenty-four working hours within any calendar month. During the strike for single shift twenty-nine working days were lost. The appeals were heard on the 13th of November.

It is announced that the Taylor Engineering Company, of Vancouver, B.C., which was constructing the road, which is designed to open up the Alice Arm Mining District of Northern British Columbia, has assigned for the benefit of its creditors. The latter, it is stated, include most of the workmen engaged on the line. They refused to continue any longer without their wages when within two days of having so far completed the road as to permit of the shipment of ore from the Dolly Varden Mine to Alice Arm Camp. The failure of the construction company, while constituting an unfortunate interruption, is not expected to hold back long the completion of the railway, and the active development of the several mining properties which it taps.

CHROME ORE ON BRIDGE RIVER, B.C.

A recent discovery of chrome ore by Frank Tracey and C. A. MacKay, assays 52 per cent. chromium oxide and a trace of platinum. This ore is the highest grade of its kind yet recorded in British Columbia. The claims are about 8 miles along the Chilcoton Trail on the Bridge River Road and 41 miles from the Pacific Great Eastern Railway.

The Pioneer Mine, Bridge River, has completed sinking a vertical shaft 300 ft. deep. Good ore showings have been revealed and the mill will be soon working to capacity.

The Lorne and Ida May Mines have been operating all summer, but very short handed, help being almost impossible to obtain.

A trail to the Henry Schwartz copper property on Gun Creek, has been partially completed by the Provincial Government. Development work this summer has produced a good showing of copper. Mr. MacKinnon, of Vancouver holds an option on this property.

William Davidson has made a discovery of copper at the mouth of Gun Creek. The first assay shows 6 per cent. copper and 2 per cent. nickel in addition to gold and silver values.

PERSONAL.

Mr. M. F. Fairlie, superintendent of the reduction plant of the Mining Corporation, is now in charge also of the mining operations. Mr. Fairlie succeeds Mr. Chas. E. Watson, who was lost on the "Princess Sophia."

Mr. A. D. Miles, president of the International Nickel Co. of Canada, Ltd., is in Toronto. The company's head office is to be in the new building of the Toronto Harbor Commission.

Mr. J. L. Agnew is now vice-president of the International Nickel Co. of Canada, and is in charge of the company's mines and smelter in the Sudbury district, until recently operated by the Canadian Copper Co. Mr. J. C. Nicols is general superintendent. Mr. E. T. Corkill is superintendent of mines. Mr. E. A. Collins succeeds Mr. Corkill as safety engineer.

Mr. John More is general manager of the nickel refinery at Port Colborne.

Mr. J. B. Tyrrell has returned to Toronto from Matachewan.

Mr. Robt. Bryce has returned to Toronto from New York.

Mr. T. J. Flynn is in Toronto.

J. A. McLean has resigned as advertising manager of the Canadian General Electric Co.

Mr. Nicol Thompson will act as chairman of the Vancouver Chamber of Mines until the next annual election.

Mr. Oscar Lachmund, former manager of the Canada Copper Corporation, has opened an office in Spokane, Wn., his line of business being the revision of smelter contracts, the determination of process for treatment of ore, flow sheets for mills and the examination and non-resident management of small mines.

Mr. James L. Brown has been appointed Overman at No. 7 Mine, Canadian Collieries (D) Ltd., vice Mr. Robert Brown.

Dr. Jas. L. McKee, formerly of the University of Cork, Ireland, has been taken on the chemistry staff at Queen's University. Dr. McKee served as chief chemist for the British Explosive Company, whose plant was recently destroyed at Trenton, Ont.

Prof. V. C. Clarke, of the department of Economic Science at Queen's University, has been released by Queen's University for a year at the request of the Dominion Government, in order that he might get to Ottawa to assist the Department of Labor in problems of reconstruction following the war.

Hon. Martin Burrell, Minister of Mines, has returned to Ottawa, after a trip to British Columbia.

Mr. Geo. Mackenzie, of the Mines Branch, has returned to Ottawa from British Columbia.

A meeting of the Council of the Canadian Mining Institute was held in Montreal on Friday, November 15th. It was decided that the next annual meeting will be held in Montreal in March.

Mr. S. T. Kirkpatrick, of M. J. O'Brien, Limited, is opening offices in the Union Bank Building, Ottawa. Mr. N. B. Davis, of Kingston, has joined the staff. Research work for the company will be carried on at Queen's University by Dr. Drury.

Mr. G. J. Mackay succeeds Prof. Kirkpatrick as Professor of Metallurgy at Queen's University.

Prof. J. C. Gwillim, Professor of Mining at Queen's University, has been granted a year's leave of absence, and will stay in the West.

OBITUARY.

Sydney A. Lang.

The death of Lieut. Sydney A. Lang at St. John's Camp recently, makes a total of seven that have passed away out of the graduating class of 1914 in the Mining Department of the University of Toronto. There were twenty members of this class. Five have made the supreme sacrifice in France, while two have died in Canada. Three other members have been on the casualty lists at various times. The record of the class is one that the University of Toronto and Canadian mining engineers may well be proud of.

F. C. Andrews, J. S. Taylor, S. D. Ellis, J. S. Fleming and G. B. Taylor fell in France. W. A. MacDonald and S. A. Lang passed away in Canada. May we be pardoned for suggesting that possibly the spirit of Dean Galbraith which was instilled in these boys at college, showed them the path of duty and helped them die like men?—D. S. H.

A. B. Clabon.

A. B. Clabon, president of the Vancouver Chamber of Mines, lost his life on the afternoon of Wednesday, October 16th, when he fell over a precipice at Silver Creek, B.C., striking a ledge of rocks 100 ft. below, from which his body rebounded and was thrown 100 ft. further down the gully. Mr. Clabon had been active in mining affairs for many years, residing for a time at the Rossland Camp, before moving to Vancouver. Keenly interested in the mineral development of British Columbia, he took a prominent part, in common with officers and members of the Chamber of Mines, in bringing to public attention the possibilities of the industry. Within the last few weeks he was instrumental in interesting Eastern capitalists in the Wolsely claims, Silver Creek, and it was in connection with this business that he was visiting the properties when the fatal accident happened. Mr. Clabon was well known in Toronto, where he resided for some time, as well as in British Columbia where most of his mining interest was.

Two tons of ore containing platinum values have been shipped from Olivine Mountain, Tulameen, B.C., by the Olivine Mountain Syndicate, the members of which include some prominent residents of Vancouver, B.C. It has been forwarded to the Faust Concentrating Plant, Seattle, Wn., for a test with a view to ascertaining whether platinum can be extracted in sufficient quantity and at a cost low enough to make the operations a commercial success. If this can be demonstrated it is the intention of the Syndicate to install a plant at Tulameen to produce platinum from the dunite which carries this mineral along with gold, copper and microscopic diamonds.

Representations are being made to Hon. Martin Burrell, Canadian Minister of Mines, favoring the appointment of a Canadian mining man to the Commission to Siberia from the Dominion. Those supporting this proposal point out that there is as much common interest between the western section of Canada and Siberia in respect of mining as there is in regard to agriculture, fisheries, and transportation. They argue that it is important that the mineral resources of the two countries would be better known and better understood in each of the countries with a view to laying the foundation for the period of economic and commercial development which will follow the cessation of hostilities.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

What is described as quite an important discovery of chrome ore is reported by Messrs. Frank Tracey and C. A. McKay. The desposit is situated in Taylor Basin a short distance off the old Chilcotin Trail, British Columbia. Samples have been left at the quarters of the Chamber of Mines, Vancouver, which have made a favorable impression. The prospects have not yet been developed.

Mining men of this Province are interested in a specimen of nickel ore from a new discovery in the Bridge River District, British Columbia. When the lead was exposed it was thought that its chief value was copper, but returns from the Ottawa Assay Office show that its primary content is nickel, with silver, copper and platinum values. Three claims have been located and the intention is to develop them without loss of time.

Assurance has been given that the development of the Silver Creek Mining Property, near Revelstoke, B.C., will not be unduly delayed by the deaths of Messrs. C. E. Watson and G. O. Randolph, who went down with the Str. Princess Sophia. A successor to Mr. Randolph will arrive at the property shortly to take up his work, and development will proceed without cessation.

Consolidated M. & S. Acquires Voight Properties.

The Voight Copper Property on Copper Mountain near Princeton, B.C., has been acquired by the Consolidated Mining and Smelting Co. of Canada. This is one of the best known low-grade properties in British Columbia, the claims covering some 6,000 acres and having been in the possession of Mr. Emil Voight for several years. At different times there have been reports that the property had been disposed of, but the companies or syndicates taking them over, while doing considerable work, failed to carry through the purchase. As a result of these transactions legal actions developed from which Mr. Voight has emerged with his title confirmed. While no announcement is made as to the monetary consideration involved in the latest deal there is no doubt that the sum is substantial as the claims have been held for close up to \$1,000,000. The Voight Claims cover fully one-half of Copper Mountain, the Canada Copper Company owning the other half, on which it has done a large amount of development work in recent years and now is fast preparing to commence actual mining. These preliminary preparations, it may be said, include the construction of a 2,000 ton concentrator, the building by the Kettle Valley Railway of a branch line, fourteen miles in length to the mine, and an extension of the power line at Greenwood, B.C., to the property, a distance of about 100 miles. It is expected that the Consolidated Mining and Smelting Co. will inaugurate extensive development operations in connection with its new holdings.

Rocher DeBoule Copper.

The Rocher DeBoule Copper Company has closed down its mine which is situated about 10 miles from Hazelton, B.C., and the ore of which carries good copper values with low values in gold and silver. It is expected that next year a small mill, capable of treating approximately 50 tons a day, will be installed for the purpose of handling the milling ore reserves now in the mine. This work, however, is entirely dependent on the labor market, cost of machinery, etc. The mine was worked steadily this year until the end of September and about 4,000 tons of ore was shipped averaging 7 per cent. copper and \$4 a ton in gold and silver values.

Surf Inlet Mines.

Late reports regarding the operation of the Surf Inlet Mines, British Columbia, are very satisfactory. The tonnage milled, gross value, and net profits for the current year since date of the last annual report are given as follows:

	Tons Milled	Gross Yield	Profit per Month
March.....	8,377	\$95,863	\$37,376
April.....	9,141	84,204	31,460
May.....	8,957	79,780	24,147
June.....	8,880	88,726	30,047
July.....	9,407	89,132	31,153
August.....	7,158	81,069	24,888
Totals $\frac{1}{2}$ year.	52,920	\$518,774	\$179,171

It is stated that the ore reserves will warrant an increase in the milling capacity when gold mining conditions become more favorable.

Silver Standard.

The Silver Standard Mine, situated about five miles from Hazelton, B.C., and the character of the ore of which is silver-lead-zinc, is proceeding with development work. According to report a new shoot of high grade ore has been struck. It is four feet in width and from it a considerable tonnage of clean ore will be available for shipment. A new 50 ton mill, which was commenced in the fall of 1917, was completed in June and changes, additions and improvements also were made in the power plant and surface buildings at the mine.

Will Develop Fitzsimmons Claims.

The Fitzsimmons Group of Copper Mineral Claims, situated on Green Lake, are to be developed, having been bonded by the Consolidated Mining and Smelting Company. A camp has been installed, a trail built to the lower mineral showings, and the work will be pushed forward during the winter. As this is the third property on the coast taken over by the Consolidated Company mining men are expressing the opinion that it is indicative of a fixed policy to obtain control of properties possessing, in the aggregate, a sufficient tonnage of ore to warrant the construction of another smelter somewhere on the British Columbia Coast. That this is the ultimate intention of the company is the belief of most of those who have been watching mining development in the province during recent years.

Quesnel Placer Mining.

Interesting experimental work has been in progress during the past summer on the placer property of the Quesnel Hydraulic Mining Co., situated on Twenty-mile Creek, Quesnel River. This ground consists of an immense deposit of gravel, in part gold bearing. Under the management of Mr. Howard Du Bois an ample water supply for large scale hydraulicking operations was laid on the property, the complete equipment costing about \$1,000,000, and being finished in 1911. The 1912 operations, however, proved a failure as the gravel did not contain sufficient gold to pay operating expenses. Since then prospecting and testing has been carried on under the present management with a view to deciding whether portions of the gravel deposit will pay to work. In the course of last year's investigations it was found that the black sand concentrates in the riffles of the sluices carried, in places, appreciable platinum values. This year, therefore, a plant was installed to save this black sand, the fine material being taken from the sluice box by an undercurrent and put through a mill consisting of jigs and table and a clean black sand concentrate being obtained. From one half to two tons of this material a day is being re-

covered; the daily recovery varying greatly as different strata of the gravel are being hydraulicked. The question of platinum values, however, is not settled yet, as some assays show platinum and others do not. Thorough testing of the black sand is being carried out.

Takes Options on Silver-Lead-Zinc Claims.

Options have been secured on about a dozen mineral claims situated on Nine Mile Mountain, twelve miles from Hazelton, B.C., by Mr. T. R. Jones, acting for a Toronto Syndicate. The more important of these properties are the Sunrise, Silver Cup, Lead King, and Miller. They were worked some years ago but since have been idle until this year, when surface work was undertaken with encouraging results. The ore is silver-lead-zinc, and it is expected that vigorous development will be initiated next summer.

Alice Arm.

The railway and tram line up the Kitsault River, linking up the Dolly Varden Mine with the Alice Arm Camp, and furnishing an outlet for what is expected to develop into one of the most productive mineral districts of the northern section of British Columbia are almost completed. Mining men anticipate that, with transportation facilities provided, the copper, silver, lead and zinc ores of Alice Arm and the tributary country will be opened up, that several large shipping mines will be in operation shortly, and that prospecting will prove further possibilities than those now indicated. It is asserted that the Granby Consolidated Mining and Smelting Co. is interested in the Alice Arm country which is taken as a sure sign that mining activity will become more pronounced. One reason given for this belief is the fact that the company has surveyed the water-power of the district, the object being, it is confidently stated, the selection of a site for a plant with which to prosecute mining operations.

INTERNATIONAL NICKEL.

New York, Nov. 10th.—The International Nickel Company reports a surplus of \$3,415,905 for the six months ending September 30th, after the deduction of charges, war taxes and preferred dividends. This is equivalent to \$2.04 a share on the common stock, as compared with \$2.68 for the corresponding months of 1917 when there was a surplus of \$4,484,396. The total income for the first half of this year was \$7,809,342, an increase over the preceding year of \$102,279. Administration and general expenses, however, increased by just about this amount.

The decrease in surplus is accounted for by the heavier appropriation made to cover United States and foreign taxes, \$2,749,126 being set aside for this purpose, an increase of practically \$1,000,000 above the reservation of \$1,741,140 during the corresponding period of 1917. After the deduction of \$995,090 for depreciation, practically the same amount as that set aside a year ago, there are profits of \$3,683,283. The preferred dividends amounted to \$267,378, leaving a balance for the common of \$3,415,905.

Satisfactory progress is being made in the installation of plant necessary for the fuller development of the Gibson mineral claims situated in the Ainsworth Mining Division, B.C. A new compressor and power plant are being placed, the former close to the mining operations and the electric plant at a greater distance. A Plenton wheel is to be used to operate the compressor, it being planned to provide sufficient air to keep three drills going at the mine. The work is being rushed with a view to having the entire plant ready for work by the end of the year, and it is confidently expected that this will be achieved, more especially as the former difficulty of securing labor seems to be somewhat relieved.

NORTHERN ONTARIO

Lake Shore

From month to month a steady increase in production is being shown at the Lake Shore Mines at Kirkland Lake. The August record was the highest in the company's history. With a capitalization of \$2,000,000, the company has been brought from a prospect to the producing stage, without further financial encumbrance, chiefly through the efforts of the staker of the claims and present president of the company, Mr. Harry Oakes. This satisfactory financing and management of the concern led to the results of the first clean-up being available for the treasury of the company. The mill was first placed in operation on the 8th of March last. Not only is the company now in a position to disburse dividends at the rate of about 10 per cent. annually, but it is also in a position to add steadily to the net surplus, and thus from profits in excess of dividend requirements will be able to finance further enlargement to milling equipment and enlarged plans of underground development of the property. The company made its initial dividend disbursement of $2\frac{1}{2}$ per cent. on August 20th last. It is considered highly probable that a second disbursement will be made before the end of the current year. With a production of upwards of \$40,000 per month the company is turning out about half a million in gold per annum.

What appears to be an important discovery of gold has been made on the Cullen-Renaud claims adjoining the Miller-Independence property at Boston Creek. The new find is a short distance south from the north boundary of the south claim of the group. The vein has a strike of southeast and northwest and may thus be said to run at right angles to the Miller-Independence. The break in which the gold values occur is about eight feet in width. Exceedingly spectacular splashes of gold are in evidence. However, what is considered a more important feature of the deposit is the very probable presence of tellurides in the ore. This property was recently optioned to Robert W. Norrington and his associates of Detroit, and the work being done is under the supervision of these interests. The work of further opening up the vein is proceeding, and it should soon be possible to estimate the importance of the find. Earlier efforts at the opening up of this property it appears were partly conducted on this vein which cut across a large porphyry dike on which development work was chiefly centered. At one point the dike was broken up and contained high grade gold values, while either to the northeast or southwest it was found to contain little or no gold. Thus some years ago the present vein was in reality discovered without the owners of the property being aware of the fact that it constituted a high grade vein cutting the porphyry dike at right angles.

Miller-Independence

Cross-cutting is under way at the 200-foot level of the Miller-Independence property at Boston Creek. The ore deposition has been proven to continue with undiminished consistency to this depth and the richness of the vein matter is second to none so far discovered in the whole north country. With the 40-ton mill in operation within the next week or two, and drawing ore from such an important body the mine promises soon to become an important producer. A large number of other properties in the district, including the Boston Gold Leaf, the Mondeau, the Hughes Group, the Cotter, and others are receiving a good deal of attention and a number of more or less important discoveries have been recorded. Thus the Boston Creek field may safely be said to be now in the throes of a boom, which if normal conditions existed, would probably equal any other such period in the life of the various mining camps of the north country.

Pittsburg-Lorrain

Milling operations continue by the Pittsburg-Lorrain Syndicate, operators of the old Currie Property, as well as operators under lease of the old Wettlaufer mine of South Lorrain. A small oil flotation plant has been added to the equipment of the old mill on the property, and is being used in the treatment of the ore. During the month of September the company shipped one carload from the Pittsburg-Lorrain and it is understood another shipment is about ready to go forward.

Teck-Hughes

Underground development at the Teck-Hughes mine has been resumed at Kirkland Lake, and efforts are being made to get the required number of men to place the milling end of the mine in operation also. The mine was closed down several months ago due to the supply of labor being inadequate, and the costs of material almost prohibitive. The announcement of a resumption of operations, therefore, came as somewhat of a surprise in the north. The property is equipped with an 80-ton mill. The ore bodies in the mine occur in more or less lenticular bodies, these bodies sometimes widening out to upwards of thirty feet. The operation of the mill during previous working did not prove as satisfactory as might have been expected. The policy to be adopted by the company in the new effort at operation has not been announced.

Schumacher

A loss of \$7,695 for the fiscal year's operation ended March 31st last, is shown in the annual report of the Schumacher Gold Mines, Limited, which is being mailed to shareholders. Bullion production amounted to \$202,387, and other small credits raised the total income to \$202,783, while costs total \$210,479. The surplus carried forward was \$65,530, as against \$73,013 the year before.

President F. W. Schumacher says in his report that, by resorting to selective mining, the property could have been kept in operation, but that it was decided to close on July 15th, rather than mine the rich lenses of ore.

During the period of operation development work was aggressively carried on as is shown by the following figures: Drifting, 1442.2 feet; cross-cutting, 1127.9 feet; raising, 178.7 feet; diamond drilling, 705 feet; stoping, 15,753 cubic yards.

The mill treated 45,373 tons of ore valued at \$259,365.30 and recovered bullion worth \$242,060.84. Income from other sources amounted to \$635.59. Operating cost amounted to \$234,021.33 being \$1.22.02 per ton of ore milled for milling, and \$3.93.75 per ton of ore milled for mining, and all other charges except depreciation. The foregoing figures are from the period between March 31st, 1917, and July 15th, 1918.

Referring to the success of the adjoining properties, the Hollinger and McIntyre at depth, the president points out that the Schumacher directors had mapped out a policy of exploration at depth, but war conditions prevented its carrying out, consequently ore reserves have not been augmented much since the previous annual report.

Toronto, Nov. 14th.—A special meeting of the shareholders of the Schumacher Gold Mines was held immediately before the annual meeting to-day, at which the by-law providing for the sale of 100,000 shares of treasury stock at a discount of not more than 55 per cent. was ratified. A total of \$1,260,000 shares were represented.

At the annual meeting the annual report was passed and the old directors were re-elected, except that Charles A. Cover was elected in place of O. C. Manley, F. L. Culver, vice-president, presided and spoke of the in-

evitable favorable effects of the imminence of peace on the gold industry, and expressed himself as sanguine that it would not be very long before the mill resumed operations.

He said it was the intention of the management to sink the main shaft ultimately to the 1,000 or 1,200 foot level. The mill, he added, had a capacity of 180 tons per day, and a small addition to machinery would readily increase the capacity to 300 tons.

THE SPITZENBERGEN COAL MINES.

There have appeared recently in the daily press many news items concerning coal mining in Spitzbergen. These followed an announcement that a British expedition had reached Spitzbergen to operate the mines.

The development of the coal mines of Spitzbergen is largely due to the efforts of an American, well-known in the Lake Superior iron districts, J. M. Longyear, of Marquette. He successfully carried on exploration in the face of many difficulties, not the least of which was the inability to secure title to the properties.

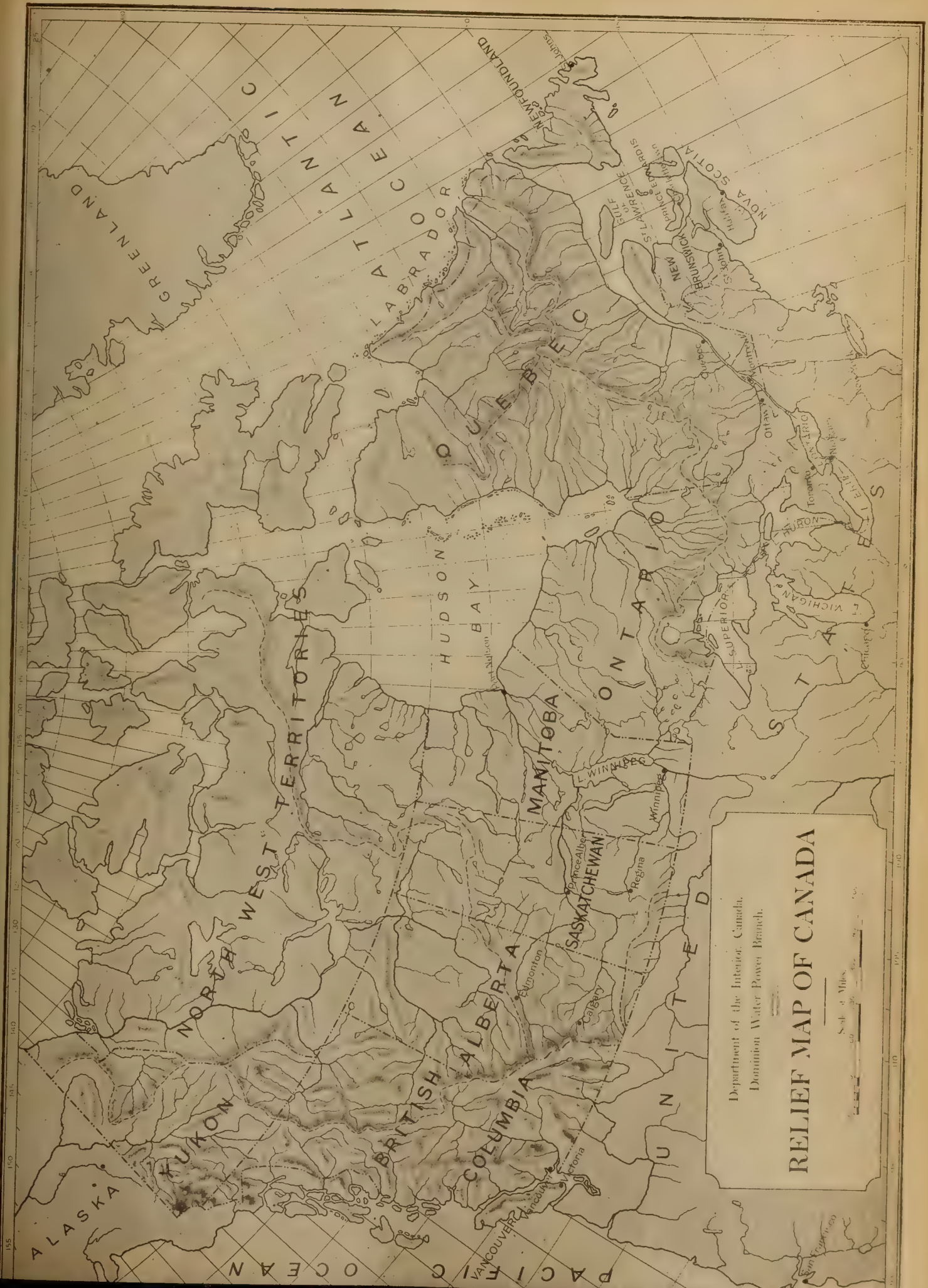
The Spitzbergen islands apparently belong to no country. Mr. Geo. E. Edwards, in an article published by the "Mining World," a few years ago, quoted Mr. Longyear as saying, "If some one stronger puts us off, the property is his." The British Government apparently declared sovereignty over Spitzbergen in 1870, but later renounced title.

The Arctic Coal Co. organized by Mr. Longyear began operations in 1905, holding its property only by possession. Though cut off from the outside world for about eight months of the year, mining was carried on steadily. Mr. Edwards wrote in 1914: "The mine is on a hillside, and the coal is dropped to the stock pile on the ocean shore at Advent Bay by means of an aerial tramway. When navigation opens (in June), this stock-pile contains about 100,000 tons, which is about the present annual shipment. The coal is loaded by crane into cars which run out to bins at the ship landing at the end of a long dock. The dock remains a mass of ice and stone the year round. . . . Everything used about the mines must be shipped in to Spitzbergen, even timber. . . . The staff are mainly American and Norwegian. . . . Two seams are being worked. These contain about 100,000,000 tons of coal, estimated as in sight."

The Norwegian Government has a wireless station about 30 miles from the coal mine, and there is a smaller installation at the mine thus giving communication with the outside world.

DEVELOPING MINERAL DEPOSITS NEAR EDGEWOOD, BRITISH COLUMBIA.

Near Edgewood, B.C., on the west side of the Arrow Lakes, and 100 miles from Revelstoke, B.C., there is a mineral belt colloquially known as Lightning-Peak which is being actively developed. There is work in progress on six properties in this locality, the Waterloo, Silver Spot, Dictator and Extension, Rampolo, Lightning Group and Lumpy Group. High grade ore is being shipped from the Waterloo and it is the intention to continue work all winter. Development is underway on the Silver Spot, Dictator and Extension, and the Rampolo, some very fine ore being in sight on the latter. The Lightning Group will be worked without cessation and the Lumpy Group, a new discovery, is to be opened up by the driving of a tunnel this winter to the ledge at 100 ft. depth. Camp is being built and supplies secured. The ledge is said to be 60 ft. wide, and to give values of 145.5 ounces silver, with a picked sample showing 675.5 ounces at the grass roots. A pack trail is the only present means of transportation and it is understood that the Government is to be asked for financial aid in the construction of a permanent trail or wagon road.



KERR LAKE

The annual report of the Kerr Lake Mining Company for the year ending August 31st proved pleasing reading for the shareholders of the famous Cobalt company as well as for all interested in the welfare of the mining camp. In spite of the company's record production the ore reserves were maintained, showing as of September 1st, 1918: 34,730 tons containing 639,800 ounces of silver, and 997,500 ounces of high grade silver, a total of 1,637,000 ounces of silver. In ounces produced as well as value received for the product the past year was the best in the history of the company. The production for the past year amounted to 2,582,993 ounces, against 2,551,345 ounces the preceding year. The total income of the operating company was \$2,394,218, against \$1,909,465 in 1917 and \$1,286,209 in 1916. After paying surplus and dividends a surplus was left of \$1,022,316, an increase over the previous year of \$344,841 and an increase over 1916 of \$880,615. The high price of silver for the current year accounts for the big surplus after the payment of the 20 per cent. in dividends. The company carried forward a balance from the previous year of \$1,711,045 which brings the balance carried forward to the end of the present year to \$2,733,361, while the outstanding stock of the company equals only \$3,000,000. The costs of production totalled 28 cents per ounce. The total amount paid in dividends to August 31st, 1918, was \$7,710,000.

During the year 3,088 feet of development work was done by drifting, cross-cutting, raising and sinking in the more favorable portions of the property. This development footage compares with 3,105 feet last year. As the ore reserves of the mine are decreasing each year, we may expect the grade of future ore extracted to also decrease. The total estimates of ore given in the report may be considered positive commercial ore under present conditions, although future development by stoping and otherwise may somewhat increase these figures."

This statement by the company proves the importance of the silver mining industry not only to the shareholders of the Kerr Lake Mining Company and the Cobalt district itself, but to the Province of Ontario, and the Dominion of Canada, all of which receive in one form and another a share of the large earnings of this progressive mining concern.

DETERIORATION OF WIRE ROPE.

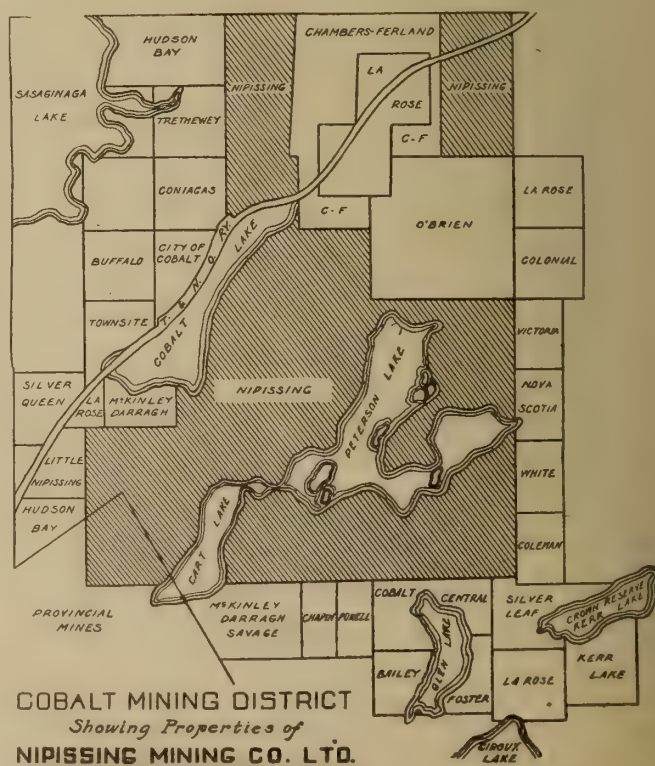
Wm. Fleet Robertson, Provincial Mineralogist for the Province of British Columbia, has returned to Victoria from Montreal, where he has been testing the cable used in Protection Shaft, Western Fuel Company of Canada, the breaking of which allowed a descending cage, loaded with miners on their way to work, to fall, carrying its passengers to instant death. What Mr. Robertson was able to ascertain as to the cause of the breaking of this rope will be told to a Coroner's Jury in Nanaimo, B.C., on the 19th of November. It is understood that he will be able to show that the break was the result of internal corrosion, brought on by the action of water. This, however, is not official, but it is known definitely that the Provincial Mineralogist carried out some careful experiments in the laboratory of McGill University and that, as a result, he will have some interesting statement to make, not alone as to the reason for the deterioration of the steel rope of Protection Shaft, but with reference to the best means of preserving cables of similar character used in mining operations from like deterioration.

INTERNATIONAL COAL CO.

Diamond drilling of coal measures situated near the mouth of the Chemainus River, Vancouver Island, is being resumed as a result of the successful defence in the

court by Mr. H. W. Treat, of his Provincial Title to these coal lands. The soundness of the licenses he holds, it will be recalled, was contested by the E. & N. Railway Co. Mr. H. W. Treat announced that the work would proceed a few days after the court's decision. He is of the opinion that the coal measures in question are the same as were worked by the old Wellington (B.C.) Mine, the area being prospected in this instance being about eight square miles, off the foreshore. The operations, it has been disclosed, are being carried on by the International Coal Co. at the head of which is Mr. Samuel Hill, of Seattle, Wn., son-in-law of the late railway magnate, Mr. James J. Hill. It is pointed out that one great advantage possessed by this property in the event of the existence of coal in commercial quantities being proved, is its accessibility. Its location on the waterfront, it is figured, will permit coal to be placed in the hands of dealers at least 50 cents a ton cheaper than can be done in the cases of most of the Island mines.

Advices from the Stewart (B.C.) Mining Camp indicate that that little community has suffered severely through the ravages of Influenza. With insufficient drugs, no doctor immediately available, and little or no liquor to be had, the patients not only were without skilled professional attention, but could be given nothing more than personal care. The latter was provided by the miners and prospectors of the surrounding districts, who dropped their work for the purpose, all the women of the town being ill. In a mining way Stewart seems to be flourishing, miners from the locality predicting that it is going to prove the biggest gold and silver producing section of British Columbia. The Bush Property near Cascade Creek, recently acquired from a New York Syndicate by Mr. R. K. Neill, of Spokane, Wn., is spoken of most optimistically. Mr. Neill, who came south some weeks ago, is making arrangements for the transportation of ore this winter. The Nesbitt, George, and Lesley properties also are mentioned, and a new company was incorporated recently to work the latter group.



Map showing location of Kerr Lake property.

The Situation at Rossland.

One of the most striking illustrations in British Columbia of the effect of the reduced purchasing power of gold is the situation at present at Rossland, B.C., where the mines of the Consolidated Mining & Smelting Co. have been practically closed down. There has been no ore shipped for some months although work is being carried on in the chief mines of the Camp with small forces. Those employed, however, are engaged only in development, preparations being made for the renewal of activity as soon as conditions again become normal. Only about 200 miners are working in the Le Roi, Centre Star, and War Eagle, while about 80 are employed in the Josie all of which are Consolidated Company's mines. On the Velvet, situated about nine miles from Rossland and owned by Granby Company interests, there are some 50 men. The people of Rossland, however, are not discouraged. The camp is being sustained by other forms of mining and better times than ever are anticipated later on when, it is expected, the mines now dormant will be reopened on a larger scale than heretofore. It is the firm belief that the time is not far off when costs will decline and the demand for gold will continue to be insistent.

Loper Goes to Penitentiary for Over Issue of Stock.

Mining men of this Province have been following the prosecution of Mr. G. Weaver Loper, formerly president of the Lucky Jim Zinc Mines of Victoria, B.C., with considerable interest. On October 2nd, he pleaded guilty to the charge of fraudulently over-issuing stock of the concern, having been arraigned at Spokane, Wn., He was sentenced to a term of from one to ten years in the penitentiary of that State.

Developing Old Sport Copper Property.

Development work on a fairly large scale continues on the Old Sport Group, which is a block of claims under bond to the Consolidated Mining & Smelting Co., since September, 1916, situated on Elk Lake near Quatsino Sound. Operations up to the present have been directed to the proving of a large tonnage of low grade copper ore which may be said to have been already practically established. Diamond drilling has been carried out with satisfactory results and it is confidently expected that it will not be long now before the company is prepared to commence shipping. The ore values, generally speaking, run between 1.4 and 4 per cent. Mr. Wm. Brewer, District Mining Engineer, in his report of 1916, says, in this connection: "In some parts of the orebody exposed in the main adit the copper values run as high as 14 per cent. for a width of 4 or 5 feet, but, so far as known at present, these enriched shoots are irregular and of such limited extent that the value of the property is based on the much larger tonnage of ore of low grade." Last year Mr. Brewer visited the property again and, among other things observed: "A water power plant has been developed from Canyon Creek, which furnishes at present with a 350 ft. head, 50 horse power, but can be developed to furnish about 425 horse-power at low water. The flume is 8,000 ft. long to a pipe line 900 ft. long. A compressor plant for two drills is installed at the camp on Elk Lake and the air carried to the mine-workings through a pipe-line; also an electric light plant, the dynamo of which is run by a 6-inch Pelton motor. At the mine there is a 7 x 9-inch double cylinder friction-hoist run by compressed air which hoists a 1-ton skip. There is also a Cameron sinking-pump, capacity 65 gallons a minute, and an Allis-Chalmers feed-pump, capacity about 35 gallons a minute." Plans are said to be in hand for the construction of a line of railway from the mine to the coast for the purpose of facilitating the transportation of ore,

Developing Copper Deposit on Sunlock Group.

Another promising Vancouver Island property, which is attracting considerable attention, is the Sunlock Group, situated on the Jordon River about forty-two miles by motor road from Victoria, B.C., It is in the development state as yet, but the extensive work being carried out under the supervision of Mr. R. H. Stewart, manager, and formerly with the Consolidated Mining & Smelting Co., has had such results that mining men are predicting that it will prove one of the biggest producers of the Province. Mr. W. M. Brewer, District Engineer, inspected the property last year. Referring to the development work done up to the time of his visit he says that it "consisted of four adits or tunnels exposing three distinct zones, as well as extensive surface stripping across another, known as the 'Centre Zone,' where three open-cuts have been made on apparently three separate mineralized zones at elevations between 780 and 865 feet. Each cut is about 20 feet long across an orebody." It is a low grade copper prospect, samples showing values running between 1.2 to 2.7 per cent., and some carrying gold and silver to the combined value of about 50 cents a ton. This property is being opened up by British Columbia capital chiefly. Besides the work of establishing ore tonnage, which is going ahead steadily, a wagon road has been constructed this year a distance of 6,000 ft. for use in shipping supplies, etc., and also, ultimately, for utilization in the transportation of ore.

The Monitor Mine is Shut Down.

The Monitor Mine, Alberni Canal, Vancouver Island, has been shut down temporarily. It is understood that Mr. Samuel Rider, of St. Albans, Eng., one of the chief owners, is contemplating a re-organization of affairs along such lines as will permit the property to be reopened and established as a permanent shipper. This property carries copper running from 1 to 18 per cent.

MR. C. F. LAW ADDRESSES BOARD OF TRADE.

The urgent need of developing an iron and steel industry in British Columbia was the keynote of an address delivered by Mr. C. F. Law, chairman of the Mining Committee of the Vancouver Board of Trade, before a convention of the British Columbia Boards of Trade on the 15th of October. He asserted that there were 12,000,000 tons of iron ore in sight in the iron deposits along the coast, the Gulf Islands and in Northern sections of the Province. He advocated a bonus by the Dominion Government on pig iron production. Dealing with the obtaining of the necessary fuel he told of the anthracite field of the Carbon District, British Columbia, declaring it to be one of the richest in the world. Touching on the slump in gold production, Mr. Law, recommended the remission of taxation on gold mining, and that all supplies and materials be permitted to enter Canada duty free.

LOCATING CLAIMS IN GRAND FORKS DIVISION.

As illustrating the present mining activity in British Columbia, some figures dealing with the condition in the Grand Forks Mining Division are interesting. In this section this year up to the end of the month of July there had been recorded 80 mineral locations and between January 1st and September 30th, there were recorded 53 certificates of improvement. It may be stated that this section includes the chrome belt of Cascade, B.C., which to some extent explains the remarkable showing made in locations.

According to prospectors returning from the district southwest of Matagami, near Devil's LJe, indications of platinum have been found. No details regarding the reported find are to hand as yet.

MINING IN HAZELTON DISTRICT, B. C.

Mr. J. D. Galloway, Provincial Resident Mining Engineer for the North-Eastern Mineral District of British Columbia with headquarters at Hazelton, B.C., states that mining development in this district has not been as active during the past year as its mineral possibilities warrant, because of the high cost of labor and of mining supplies, especially powder and machinery. He expresses the opinion that, while capital has been available for mining in many forms, the high cost of development has hindered the investment of capital in properties in the prospect stage which necessarily is speculative. Undoubtedly when the war is over, Mr. Galloway avers, many men will return to the northern country and prospecting, which now has practically ceased, will be revived and important discoveries may be made. Referring to the Keithley Creek section of the Cariboo District, he says that it is now virtually deserted although there is considerable placer ground remaining which may be worked at a profit. With the revival of gold mining which should take place after the declaration of peace, he anticipates that the district will attract more attention.

MILL COMPLETED AT SILVER-STANDARD MINE.

The Silver-Standard Mine, Omineca District, B.C., has completed the construction of a 50-ton mill which was commenced in 1917, and changes, additions and improvements also have been made in the power plant and surface buildings at the mine. It is estimated that the cost of the new construction has run between \$30,000 and \$35,000. From June to September the mill was run one shift treating from 17 to 20 tons a day, but it was gradually improved and now is operating two shifts and the production for the last six months of 1918 is estimated at 4,900 tons (milled). Practically no mining was done this year until the 1st of October, the ore for the mill being taken from the dumps. Development, however, is proceeding steadily with very satisfactory results.

MARKETS

STANDARD MINING EXCHANGE.

Quotations, November 16th, 1918.

Silver.	Asked.	Bid.
Adanac .....	.11 1/2	.11
Bailey .....	.04 1/2	.04
Beaver .....	.35 1/2	.35 1/4
Cham-Ferland .....	.12	.11
Coniagas	3.50	3.45

Crown Reserve .....	.25 1/4	.24 1/2
Foster .....	.03 1/2	..
Gifford .....	.02 1/2	.02
Gt. North. ....	.04	.03 1/4
Hargraves .....	.03 7/8	.03 1/4
Hudson Bay .....	..	20.00
Kerr Lake	6.25	..
La Rose .....	.37	.33
Lorrain .....	.02	..
McKinley-Darragh .....	.50	.47 1/2
Min. Corp.	2.70	2.60
Nipissing .....	..	8.60
Ophir .....	.04	.03 5/8
Pet Lake .....	.09 1/2	.09 1/4
Silver Lake .....	.02	.00 1/2
Rt. Way .....	.03 1/2	.03 1/4
Temiskaming .....	.33 3/4	.32 1/2
Trethewey .....	.22	.21
York, Ont. ....	.01	.00 1/2

	Gold.	Asked.	Bid.
Apex	e...	.04½	.04¾
Boston Creek .....		..	.30
Davison Gold .....		..	.62
Dome Extension .....		.29	.28½
Dome Lake .....		.18½	.17
Dome Mine		14.00	13.75
Eldorado .....		.02	.01
Elliott-Kirkland .....		.36	..
Gold Reef .....		.02½	..
Hollinger C.		6.00	5.90
Inspiration .....		.02	.01
Keora .....		.10	..
Kirkland Lake .....		.40½	.40
Lake Shore .....		.95	.90
McIntyre		1.76	1.74
Moneta .....		.10	..
Newray .....		.18	.15
Porcupine Crown .....		.27½	.27
Porcupine Imperial .....		.03	.02¾
Porcupine Tisdale .....		.02	.01½
Vipond .....		.25	.24
Pres'on .....		.04¾	.04¼
Schumacher .....		.34¾	.34¼
Teck-Hughes35½	.33
P. V. N. T.24	.23½
Th. Krist07¾	.07½
West Dome15¼	.15
Wasapika G.41	.39

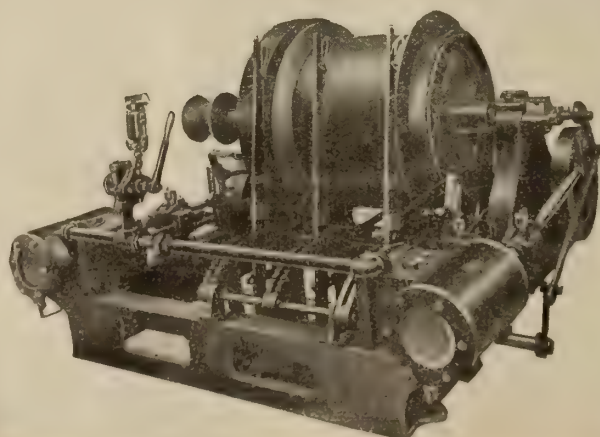
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Up-to-date plants for the manufacturing of Prest-O-Lite compressed acetylene are located at Shawinigan Falls, Que., St. Boniface, Man., and Merritton, Ont. The welding and cutting equipment is made and marketed at the Toronto plant. In addition, the company maintains a warehouse and office in Montreal, and a sales office in Winnipeg. The number and location of these different plants insures adequate distribution and prompt, efficient service from coast to coast.

Mr. R. H. Combs, who has been with the Prest-O-Lite Company Inc., in various capacities since 1908, occupies the position of general manager of the new Canadian company, and under his expert supervision the success of Prest-O-Lite Company of Canada, Limited is assured.

AN ELECTRIC RADIATOR.

In a year when the shortage of fuel has rendered the heating of our houses and camp buildings a more than usually engrossing problem, it is interesting to note that the Salisbury Electric Company, Limited, of Toronto, is making an electric radiator, which, with a very low current consumption will produce heat, and radiate it in exactly the same way as its larger relations, the steam and hot-water radiator.

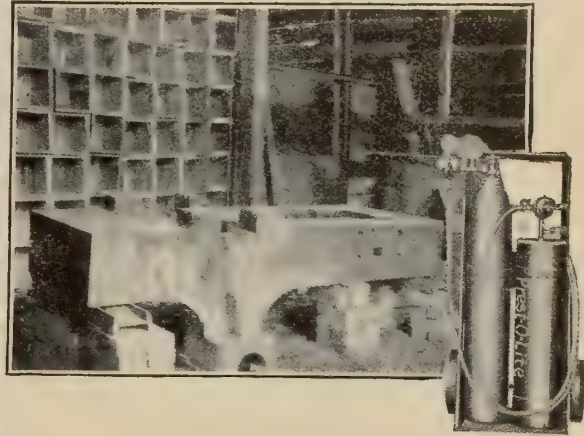
These radiators are built of pressed steel, and, instead of water, are filled with a specially treated oil, which heats very quickly and radiates the heat more rapidly than water. It is also non-freezable, a great advantage in cases where these radiators are used in small buildings which are sometimes left unheated.

The Salisbury Radiators with their low current consumption may be used with great economy in those places where there is cheap power available, and we are informed that the Granby Consolidated Mining Company have a considerable number of them in use, and find them to be very satisfactory in operation.

The Salisbury Electric Company, Limited, is the development of the old Toronto business of E. F. W. Salisbury, who is the manager of the new firm.

Arrivals from the Klondyke state that the reason for the remarkable exodus of miners from the north is the fact that the government has exempted prospectors from remaining on their claims during the war. It is asserted that the e will be just as great a rush back to the Yukon in the spring, providing peace is declared in the interim.

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MINES BRANCH

Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

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Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

Both the use (1) of oil in excess of ten pounds (0.5%) in combination with violent agitation, and (2) the use of the Callow system of aeration with any quantity of oil, appear therefore to be immune from any charge of infringement.

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- Air Hoists—**
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Ltd., Montreal, Que.
- Amalgamators—**
Northern Canada Supply Co.
- Antimony—**
Canada Metal Co., Ltd.
- Assayers and Chemists—**
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Ledoux & Co., 99 John St.,
New York.
Thos. Heys & Son.
C. L. Constant Co.
Koering Cyaniding Process
Company.
- Assayers' and Chemists' Sup-
plies—**
C. L. Berger & Sons, 37 Wil-
liam St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley, W. F. & Co., Ltd.
Koering Cyaniding Process
Company.
Mine & Smelter Supply Co.
- Babbit Metals—**
Canada Metal Co., Ltd.
Can. B. K. Morton.
Hoyt Metal Co.
- Balances—Heusser—**
Mine & Smelter Supply Co.
- Ball Mills—**
Hull Iron & Steel Foundries,
Ltd.
Mine & Smelter Supply Co.
- Belting—Leather, Rubber and
Cotton—**
Northern Canada Supply Co.
Jones & Glassco.
Can. B. K. Morton.
- Blasting Batteries and Sup-
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- Blowers—**
Northern Canada Supply Co.
- Boilers—**
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
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Marsh Engineering Works.
- Boxes, Cable Junction—**
Standard Underground Cable
Co. of Canada, Ltd.
- Buckets—**
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
Northern Canada Supply Co.
- Cable — Aerial and Under-
ground—**
Northern Canada Supply Co.
Standard Underground Cable
Co. of Canada, Ltd.
- Cableways—**
M. Beatty & Sons, Ltd.
Can. Allis-Chalmers, Ltd.
- Cages—**
Northern Canada Supply Co.
- Cables—Wire—**
Standard Underground Cable
Co. of Canada, Ltd.
- Car Dumps—**
Sullivan Machinery Co.
- Cars—**
Northern Canada Supply Co.
MacKinnon, Holmes & Co.
Marsh Engineering Works.
Mine & Smelter Supply Co.
- Car Wheels and Axles—**
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- Cement Machinery—**
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- Chains—**
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- Chemical Apparatus—**
Mine & Smelter Supply Co.
- Chemists—**
Canadian Laboratories.
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Thos. Heys & Sons.
Milton Hersey Co.
Ledoux & Co.
- Classifiers—**
Mine & Smelter Supply Co.
- Coal—**
Dominion Coal Co.
Nova Scotia Steel & Coal Co.
- Coal Cutters—**
Sullivan Machinery Co.
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Hadfields Ltd.
- Coal Pick Machines—**
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- Crushers—**
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- Drills—High Speed and Car-
bon—**
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- Ejectors—**
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- Elevators—**
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- Electric Mine Locomotives—**
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- Engineering Instruments—**
C. L. Berger & Sons.
- Engineers & Contractors—**
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Montreal.
- Engines—Automatic—**
Smart-Turner Machine Co.
- Engines—Gas and Gasoline—**
Alex. Fleck.
Sullivan Machinery Co.
Smart-Turner Machine Co.
Can. Allis-Chalmers, Ltd.
Gould, Shapley & Muir Co.,
Ltd.
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- Engines—Marine—**
Smart-Turner Machine Co.
- Engines—Steam—**
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- Gears—**
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Northern Canada Supply Co.
Hull Iron & Steel Foundries,
Ltd.
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Can. Allis-Chalmers, Ltd.
- Hangers—Cable—**
Standard Underground Cable
Co. of Canada, Ltd.
- High Speed Steel—**
Hadfields Ltd.
- High Speed Steel Twist Drills**
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- Hoists—Air, Electric and
Steam—**
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- Hydraulic Machinery—**
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- Ingot Copper—**
Canada Metal Co., Ltd.
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- Insulating Compounds—**
Standard Underground Cable
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- Jacks—**
Can. Ingersoll-Rand Co.,
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Northern Canada Supply Co.
- Kiln Linings—**
Hull Iron & Steel Foundries,
Ltd.
- Kominuters—**
Hull Iron & Steel Foundries,
Ltd.
- Laboratory Machinery—**
Mine & Smelter Supply Co.
- Lamps—**
Can. Gen. Electric Co., Ltd.
- Locomotives (Steam, Com-
pressed Air and Storage
Steam)—**
H. K. Porter Company.
- Link Belt—**
Northern Canada Supply Co.
Jones & Glassco.
- Motors—**
Can. Gen. Electric Co., Ltd.
- Machinists and Founders—**
Hull Iron and Steel Found-
ries, Ltd.
- Manganese Steel—**
Hadfields Ltd.
- Metal Merchants—**
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Geo. G. Blackwell, Sons &
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Consolidated Mining and
Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Mining Requisites—**
Hadfields Ltd.
- Monel Metal—**
International Nickel Co.
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- Ore Sacks—**
Northern Canada Supply Co.
- Ore Testing Works—**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
Hoyt Metal Co.
- Ores and Metals—Buyers and
Sellers of—**
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Consolidated Mining and
Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
- Oxy-Acetylene Welding and Cut-
ting—**
Imperial Brass Mfg. Co.
- Perforated Metals—**
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin—**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead—**
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Pipe—Wood Stave— Pacific Coast Pipe Co., Ltd.	Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Can. Allis-Chalmers, Ltd. Smart-Turner Machine Co.	Separators— Smart-Turner Machine Co.	Tanks (water) and Steel Towers— Gould, Shapley & Muir Co., Ltd.
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Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	Pumps—Vacuum— Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd. Mine & Smelter Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Hadfields Ltd.	Shovels—Steam— M. Beatty & Sons.	Transformers— Can. Gen. Electric Co., Ltd.
Pulleys, Shafting and Hangings— Northern Canada Supply Co.	Rails— Hadfields Ltd.	Smoke Stacks— Can. Allis-Chalmers, Ltd. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Marsh Engineering Works.	Tubs— Hadfields Ltd.
Pulverizers—Laboratory— Mine & Smelter Supply Co.	Roofing— Northern Canada Supply Co.	Steel Barrels— Smart-Turner Machine Co.	Turbines— Escher Wyss & Co. Can. Allis-Chalmers, Ltd.
Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlauffer Bros. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Steel Castings— Hadfields Ltd.	Twist Drills—High Speed— Can. B. K. Morton Co.
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Pumps—Sand and Silice— Mine & Smelter Supply Co.	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son. Mine & Smelter Supply Co.	Steel—High Speed— Can. B. K. Morton.	Wheels and Axles— Hadfields Ltd.
	Screens— Northern Canada Supply Co. Hendrick Mfg. Co. Hadfields Ltd.	Steel—Tool— N. S. Steel & Coal Co. Hadfields Ltd.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd. Marsh Engineering Works.
		Stone Breakers— Hadfields Ltd.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		Surveying Instruments— C. L. Berger.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
		Switchboards— Can. Gen. Electric Co., Ltd.	Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.
		Tables—Concentrating— Mine & Smelter Supply Co.	
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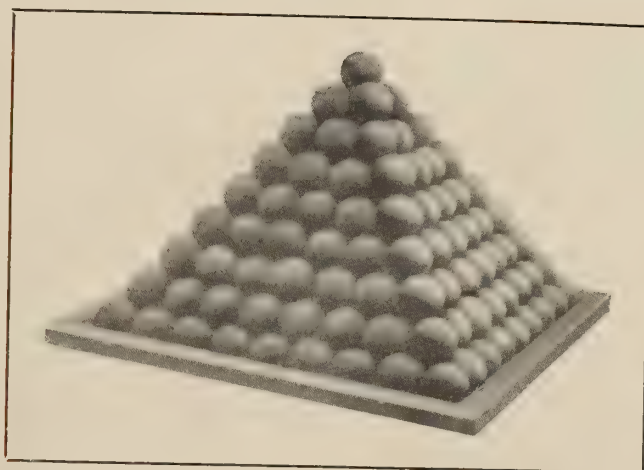
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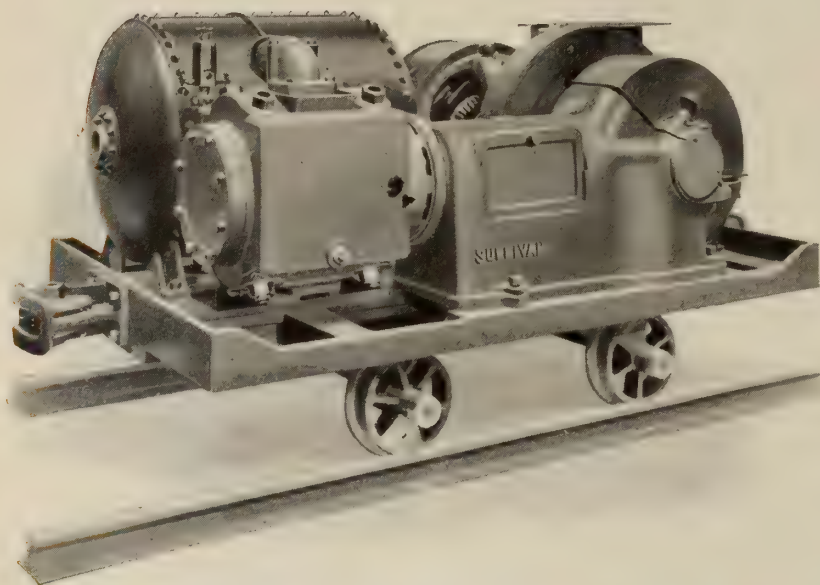
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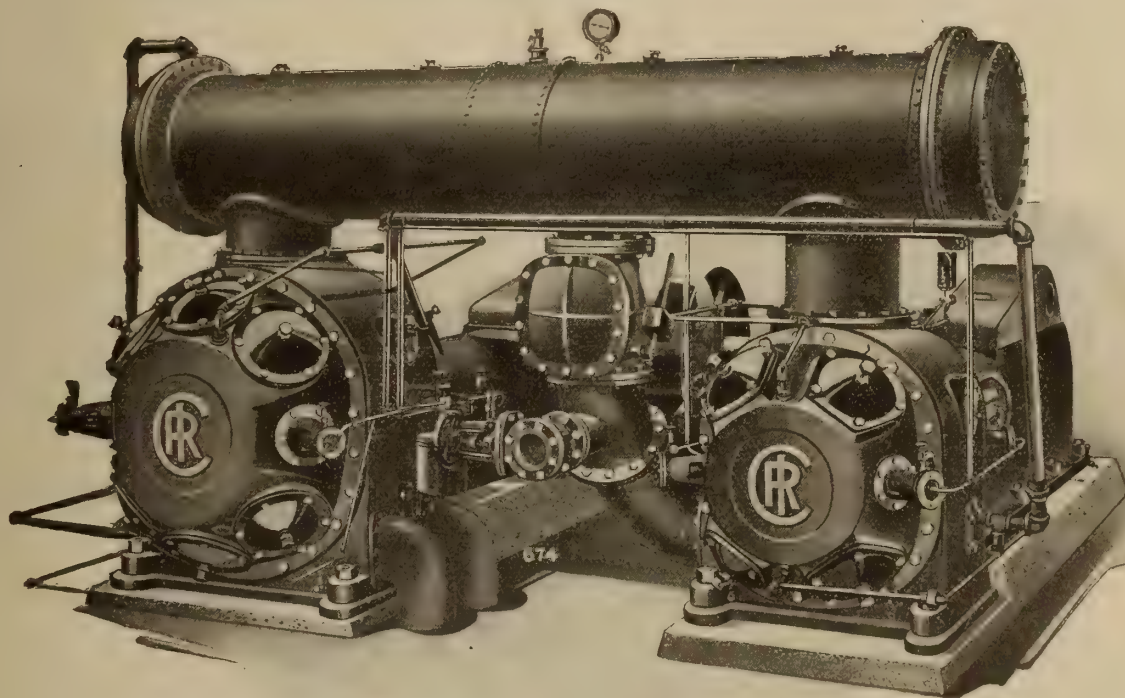
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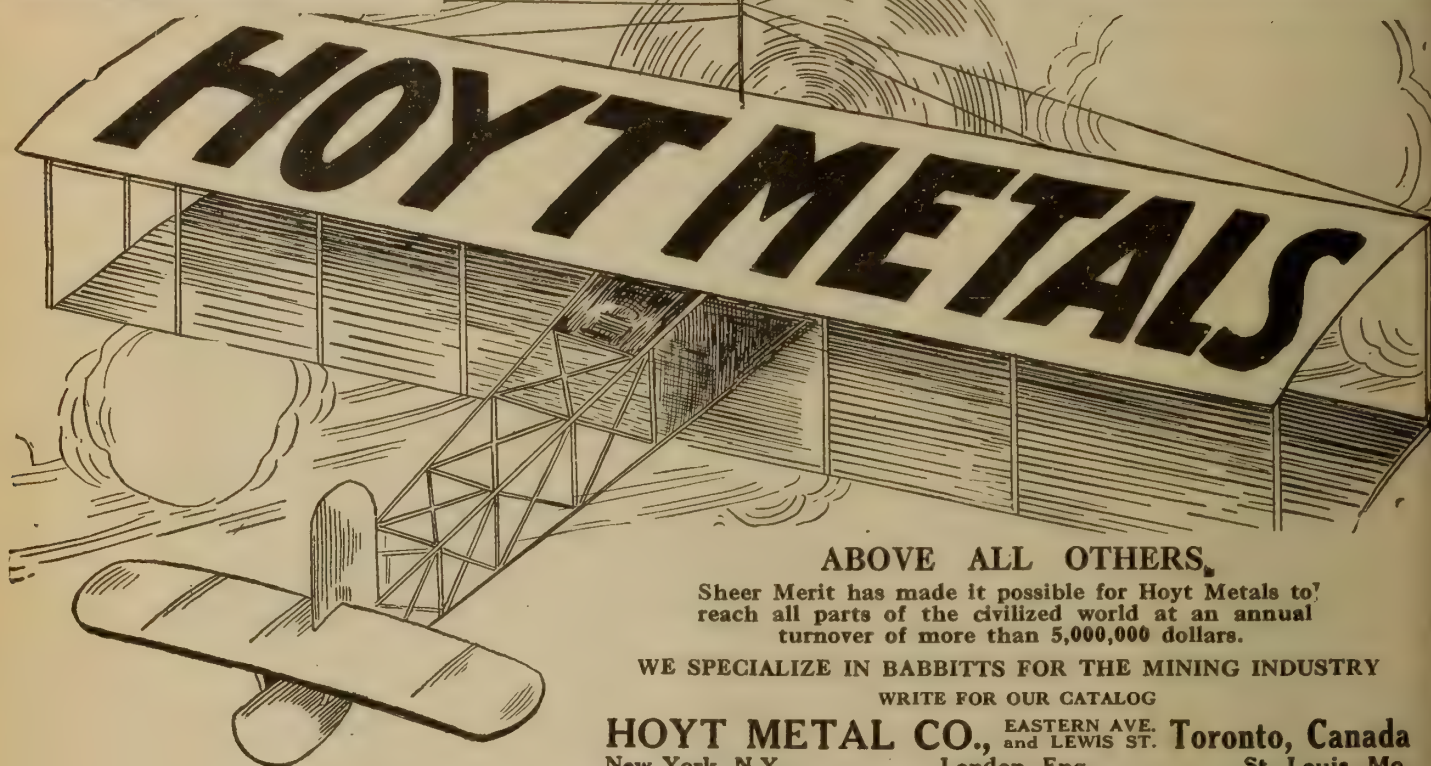
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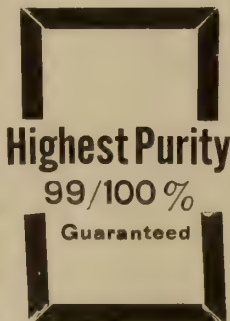
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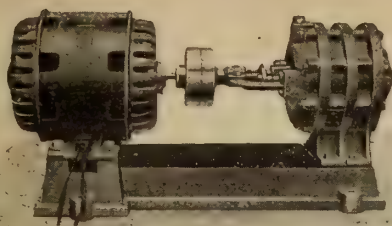


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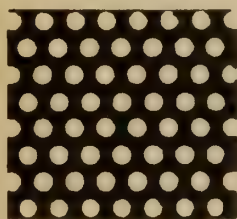
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES unanimously adjudged our basic patent for air-froth-flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision.

On May 4, 1917, in the UNITED STATES DISTRICT COURT OF MONTANA, the opinion of Judge Bourquin was filed in the case of Minerals Separation Ltd., and others against Butte & Superior Mining Company, and was followed by a decree on September 17, 1917, wherein it was adjudicated that the three claims which had been limited by disclaimer were valid and infringed, and that the seven claims adjudged to be valid by the Supreme Court of the United States were infringed. The acts thereby adjudged to be infringement included the use of mixtures of petroleum oils and mineral-froth-forming oils in a total amount exceeding one per cent. on the ore, and also the use of Callow pneumatic cells.

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On November 11, 1918, the SUPREME COURT OF THE UNITED STATES granted the petition of Minerals Separation, Ltd., and others for a Writ of Certiorari to review the decree of the United States Circuit Court of Appeals at San Francisco which had reversed so much of the decree of Judge Bourquin in the suit against Butte & Superior Mining Company as adjudged to be infringements those acts which employed oil of any kind or character used in excess of one-half of one per cent. on the ore.

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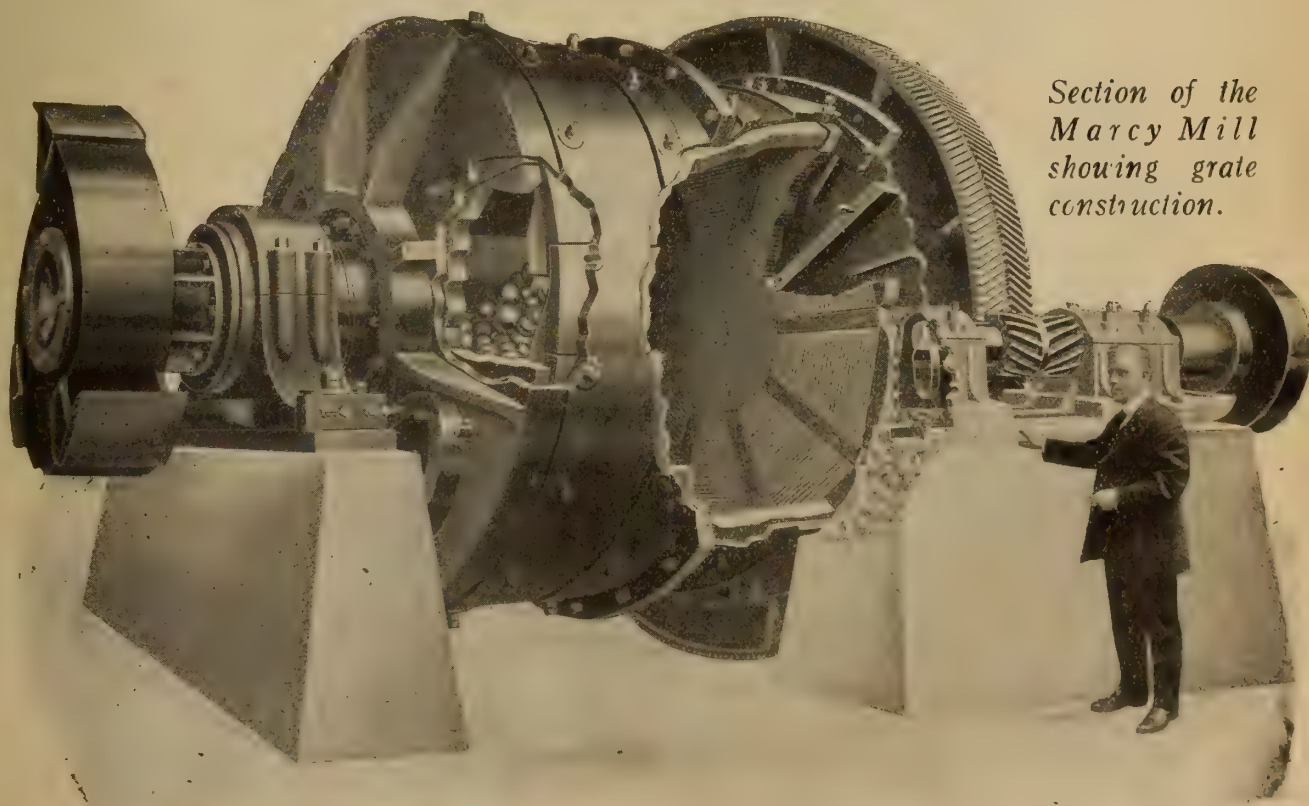
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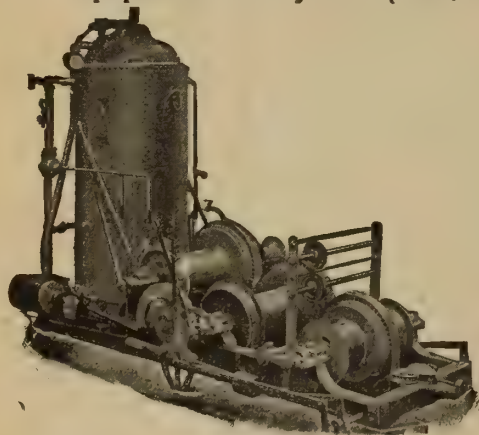
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, December 1st, 1918.

No. 23

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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When Hon. Martin Burrell, Minister of Mines in the Dominion Government, was in British Columbia recently a delegation of Vancouver Island residents waited on him with regard to the interests of settlers interested in the coal rights of the Island. They wanted some statement from the Minister as to whether, should the British Columbia Government re-enact the Settlers' Rights Act of 1917, the Federal authorities would refrain from disallowing it again. Mr. Burrell could make no definite statement, but assured his petitioners that he appreciated the importance of the matter from the viewpoint of the settlers, involving as it did title to a considerable proportion of the coal resources of Vancouver Island. He agreed that all those interested were entitled to the fullest hearing by the Dominion Government should the matter come up for reconsideration. The Settlers' Rights Act, it may be explained, gave the settlers within the E. & N. Ry. Belt a specified period in which to make claim to the coal rights within the limits of their property, they then being granted title to the coal, if able to substantiate their claims. The coal areas in question, or at least most of them, now are owned by the Canadian Collieries (D) Limited.

THE CANADIAN MINING INSTITUTE

We are pleased to publish in this issue the letter of Mr. F. W. Gray on the functions of the Canadian Mining Institute. Mr. Gray well presents the ideas of those who believe there is, or should be, a wall between engineers and other members of the Canadian Mining Institute. We do not agree with Mr. Gray; but we can assure him that there are many, both within and without the Institute, who do.

Our opinion is that the main purpose of the Canadian Mining Institute is, and should be, the development of the mining and metallurgical industry of Canada. We believe that the majority of the men best qualified to carry out this purpose are technically trained men; but we believe also that certain non-technical men are just as fully qualified. We do not agree with Mr. Gray that mining engineers should cut themselves off from other men in this work. We believe that the strength of the Canadian Mining Institute lies in the fact that it is a great factor in working out the problem of applying science to industry, and we believe that a purely professional society would not be as successful in this work as is a society, largely composed of technical men, but also including non-technical men who hold positions of responsibility in the mining and metallurgical industry. Surely we have had a sufficiency of the exclusiveness of scientific societies. Those who wish to better the position of the engineering profession defeat their own ends when they divorce themselves from the industry which they serve.

Mr. Gray says: "If it had been intimated to us that we were affiliating with a trade association and not with a technical and professional society, we should not have dreamt of an affiliation." His words imply the belief that a society cannot be a successful technical and professional society and at the same time take an active part in the development of one of Canada's foremost industries. The very existence and success of the Canadian Mining Institute is a refutation of this idea. As a technical and professional society the Canadian Mining Institute is second to none. It is more successful than most such societies because it has not divorced itself from the industry. It is certainly not a "trade association," as that term is generally used, and yet it takes an active interest in many matters affecting the mining and metallurgical industry, besides purely professional matters.

The Engineering Institute of Canada is essentially a professional society. Many civil, mechanical and electrical engineers cannot attach themselves so closely to one industry as can mining engineers, metallurgists and geologists. They do the best they can under the

circumstances. It is obviously necessary to have some society for engineers who cannot find opportunity for intercourse and united effort in a society devoted to one industry. The Engineering Institute of Canada fills this need. It is naturally the largest engineering society in Canada and it is doing very useful work. Mining engineers have in the Canadian Mining Institute an organization which gives them the advantages of such a professional society and at the same time confines its attention to the industry with which they are most concerned, and does not exclude taking a part in non-professional matters affecting the welfare of the mining and metallurgical industry.

The Canadian Mining Institute is a technical and professional society, but it is more than that. It is an Institute that recognized years ago, what the English-speaking world has recognized more particularly during the past few years, that science and industry should be closely linked together and that technically trained men are of more use to the community when they refuse to set themselves apart.

The mining and metallurgical industries in Canada as in the United States, owe a great part of their success to scientifically trained men. It is natural that in an Institute that exists for the purpose of developing Canada's mining and metallurgical industry, technically trained men should predominate. Because they do, the Canadian Mining Institute is a strong technical and professional society as well as an organization which is able to do much that professional societies cannot do.

Among the members of the Canadian Mining Institute are many non-technical men who are taking a leading part, along with technical men, in the direction of mining and metallurgical enterprises. Far from believing that this is a source of weakness to the Institute, we believe it to be a great source of strength.

During the past few years there has been much said and written of the necessity of greater application of science to industry. In the mining industry we have been particularly fortunate in having made considerable progress along this line. The very character of the Canadian Mining Institute is an evidence of this. We believe that to make of the Canadian Mining Institute an old-style professional society would be a retrograde movement. We need not only advancement in learning among technical men, but also more rapid application of learning to industry. The first step is obviously to keep those who are responsible for the policies of mining and metallurgical companies in close touch with advances in science. In an Institute which includes non-technical as well as technical men, we have something that is far more valuable than a mere professional society; and we have the professional society also.

Mr. Gray says that he "resents and will resist any attempt to belittle our technical status." So will we all. But we do not agree with Mr. Gray's implication that we belittle the technical status of an engineer when we claim that an Institute which includes non-

technical men as well as technical men is of more value to the mining and metallurgical industries than would be a society composed wholly of technical men.

COMMISSION WILL INVESTIGATE CONDITIONS IN THE CROW'S NEST COAL FIELD.

The appointment of a Royal Commission to investigate conditions in the Crow's Nest Coal Field now is occupying the attention of the parties to the recent strike. The mines of Fernie and Michel, B.C., are in operation again after an enforced idleness of some thirty-five days, the men having been granted their demand for a Single Shift, or one shift in twenty-four hours. With this concession, however, was coupled the condition that an inquiry should be instituted having in view the establishment, or otherwise, of the men's claim that there is greater danger to the life of the worker through the use of the Double Shift than there is under the system now adopted. It also was understood that the Commission would be appointed immediately and that it would prosecute its inquiry with the utmost diligence in order that the report might be available in the shortest possible space of time. The Commission is to work under authority of the Provincial Government, its personnel to consist of a representative of the miners, one of the company, and a third, the chairman, to be selected by the Minister of Mines.

The re-opening of the Fernie-Michel Mines under the new order necessitated some re-organization, as can easily be understood. Mr. J. O. Jones, advisor to Mr. W. H. Armstrong, Director of Coal Mine Operations in District 18, and Mr. Robert Livett, International Representative of the U.M.W. of A., accompanied representatives of the management of the colliery on an inspection trip of the mines as soon as the men had voted to go back to work. They went through all the working places which the company contended were in the development stage, and therefore under the terms of one of the details of the settlement agreement, not open to the application of the single shift principle. Over thirty of these places were in dispute but, finally almost all were unanimously classified, those upon which it was impossible to reach an agreement being referred to Mr. Armstrong for decision.

GRANBY PRODUCTION OF COPPER IN NINE MONTHS

The copper output of the Anyox and Grand Forks smelters of the Granby Consolidated Mining & Smelting Co., for the first three-quarters of 1918, that is to say, up to the end of September, was 29,081,635 lb. This is a very satisfactory showing in comparison with that of last year when Anyox produced 27,661,301 lb. and Grand Forks 6,858,718, a total of 34,520,019 lb. Thus, with three more months to count, the Granby Company is within 5,438,384 lb. of its mark set in 1917, and if output is continued at the rate of 9,693,878 lb. a quarter, which has been done up to date, the 1918 production from the British Columbia smelters of this company will be 4,255,494 lb. in excess of that of the previous year. As the Ladysmith Smelter, which was operated intermittently during the year and now is closed down, produced 96,212 lb. of copper and no report is yet available as to what is being done by the Consolidated Mining & Smelting Co. of Canada, or what its aggregate may be expected to be, the indications may be put down as most promising; in fact, the belief is that British Columbia's total copper output at the end of 1918 will be found to be easily equal and possibly well in excess of that of 1917.

CORRESPONDENCE

The Functions of the Canadian Mining Institute.

The Editor of the Canadian Mining Journal:

Sir,—Your editorial of the 1st November commenting on the relations between the Canadian Mining Institute and the Engineering Institute of Canada, correctly points out that failure to recognize the proper functions of the two societies has been responsible for past misunderstandings, and that if the members were more familiar with the nature of their respective societies, co-operative effort to improve the status of the engineering profession would be found not only desirable, but easy of accomplishment.

At the same time, speaking for the members of the Canadian Mining Institute resident in Nova Scotia, and in particular for the members of the Mining Society of Nova Scotia—a body that includes within its membership a number of members of the Engineering Institute of Canada—the writer desires to protest most emphatically against your opinion that the Canadian Mining Institute represents an industry, in contradistinction to the Engineering Institute of Canada, which it is contended represents a profession.

Recently the Mining Society of Nova Scotia voted to affiliate with the Canadian Mining Institute, but we can assure you that if it had been intimated to us that we were affiliating with a trade association and not with a technical and professional society, we should not have dreamt of an affiliation. We had not thought, nor did we ever expect to think, that the Canadian Mining Institute has as its chief aim the development of the mineral resources of Canada. The object of the Institute, as it has been generally understood by its members, is to provide a medium for the reading of technical papers, the dissemination of technical knowledge, and the practice of mining as it has been improved from year to year by the actual experience of its members in mining operations and prospecting. The connection between these objects and the development of the mineral resources of a young country like Canada is naturally so intimate as to be inseparable, and it has been a necessary concomitant that pioneers of the mineral industry—not necessarily technically trained men—should have been prominently associated with the Canadian Mining Institute. Nevertheless this fact does not lessen in any way the claim of the Institute to be as truly a technical and professional society as, for example, the Institution of Mining Engineers in Great Britain or the American Institute of Mining Engineers.

The time had probably arrived—was perhaps overdue—for the Canadian Mining Institute to adopt the stricter classification of its new members into fully qualified technical members and associate members that is customary in technical societies, but the retention of full membership by those older and valued members of the Institute who do not claim technical qualifications should not be any source of offence to the Engineering Institute of Canada.

On the other hand, it is open to grave doubt whether the Engineering Institute of Canada has improved its own status or the future prospects of the engineering profession in Canada if it has conceived the slightly grandiose and impractical scheme of combining in one society all the ramifications of the engineering profession. The profession of the civil engineer is wide enough and honorable enough in itself not to require

enlargement, and it discloses some narrowness of viewpoint to conceive that any one society can hope in the years to come to comprise within its scope the varied and at the same time severely specialized activities of the civil, railroad, mining, electrical, mechanical, chemical and steel-works engineers of the Canada that is to be; not to mention the extension of the engineering profession into the textile, shipbuilding and other industries that will occur to those who desire to follow the engineer into all his occupations. It may well prove to be that this conception will act as a limiting factor and a source of hindrance to the best interests of the engineering profession in future years.

The conception of a society that would co-ordinate the activities of all the engineering bodies, while allowing complete autonomy and individual independence to the several technical associations of Canada would seem to be a more judicious and proper arrangement than the absorption of the existing societies by one dominant society, and it would also be more likely to achieve a permanent career of usefulness.

If the conception of the Engineering Institute of Canada is merely as your editorial states, to “improve the status of the engineering profession,” it would seem to be a rather selfish ideal, and not in its essence distinguishable from trades unionism. The old-fashioned idea of a technical society was that it existed for the advancement of learning, and if it is in the minds of any member of the Canadian Mining Institute that the Institute represents an industry; or if it is in the minds of the members of the Engineering Institute of Canada that the Institute exists only to improve the status of the engineering profession, many people would feel inclined to agree with you in asking, “Would it not be well for each Institute to undertake to make the members of the others more familiar with the nature of the respective societies?”

It does not appear to have occurred to the Institution of Civil Engineers in Britain to criticize the rules of the Institution of Mining Engineers, and such action would be bitterly resented. The profession of the Mining Engineer calls for a severity of studies and for a breadth of scientific requirements that justify mining engineers in believing themselves qualified to manage their own affairs and to maintain their own technical societies without interference from other bodies, nor is it necessary for any mining engineer in Canada to belong to any other association than the Canadian Mining Institute and its affiliated societies, to enable him to claim the status of an engineer.

The Nova Scotia Mining Society is one of the oldest technical societies in Canada. Its membership is almost exclusively composed of technical men daily practicing their profession, but we have never considered the Society represented the mining industry in the province except as a body of engineers associated closely with that industry. We resent, and shall resist, any attempt to belittle our technical status. “The Canadian Engineer,” commenting editorially on your remarks of the 1st November, quotes Professor Haultain’s dictum that the Canadian Mining Institute “could never be absorbed completely by the Engineering Institute because its membership included many men who could not qualify for the Engineering Institute.” We have no intention of being “absorbed,” and presumably we shall be consulted, because if not, then our critics should in honesty choose some other word than “absorption” to describe their intentions.

Yours, etc., F. W. GRAY,
Editor, Mining Society of Nova Scotia.

ONTARIO'S METAL PRODUCTION FIRST NINE MONTHS, 1918.

Returns received by the Ontario Bureau of Mines from the smelters, refining works and metalliferous mines of the province for the nine months ending September 30th, 1918, are summarized in the table below, which, for purposes of comparison, gives figures for the corresponding period of 1917:

Product.	— Quantity —		— Value —	
	1917.	1918.	1917.	1918.
Gold			\$ 6,754,535	\$ 6,875,766
Silver, ounces	15,236,002	13,145,596	12,001,875	12,500,980
Cobalt, metallic, lbs.	295,866	317,291	433,739	702,717
Copper, metallic, lbs.		359,713		79,137
Nickel, metallic, lbs.	166,921	582,992	67,499	
Nickel oxide, lbs.	10,831	5,592	3,025	1,731
Cobalt oxide, lbs.	276,769	397,728	323,162	572,845
Other cobalt and nickel compounds, lbs.	276,217	367,923	30,025	53,784
Molybdenite, lbs.	65,827	43,631	83,550	54,671
Lead, pig, lbs.	1,080,000	1,291,571	139,948	115,117
*Nickel in matte, tons	31,064	33,508	15,532,000	20,105,087
*Copper in matte, tons	15,928	17,052	6,371,200	6,820,785
Copper ore, tons	2,658	16	33,419	318
Iron ore, tons	138,808	154,243	559,099	697,839
Pig iron, tons	513,232	541,564	9,841,438	14,728,461

*In 1917 nickel and copper in the form of matte were valued at 25 and 20 cents per pound respectively. For 1918 the values have been placed at 30 cents for nickel and 20 cents for copper.

Gold.

Gold production has been well maintained for the period, considering adverse war conditions which have been aggravated rather than improved during 1918. The signing of the armistice on November 11th will have the effect of releasing men almost immediately from munition plants and this will tend to relieve the labor shortage from which the mining industry as a whole has suffered. The value of the output, \$6,875,766, exceeds that for the corresponding period in 1917. This was produced from 711,185 tons of ore milled. In addition, 65,939 ounces of silver, worth \$64,029, were recovered. Hollinger and McIntyre continue to be the largest producers, the output respectively being valued at \$4,685,586 and \$1,206,875. New producers this year include Davidson at Porcupine, Patricia at Boston Creek and Lake Shore at Kirkland Lake. From the last mentioned, since milling operations started in March, 11,253 tons of ore were treated with a recovery in gold and silver of \$271,265, or \$24.10 per ton. At Boston Creek a new find of gold telluride on the Miller Independence has attracted a great deal of attention to this camp.

Silver.

Despite a decline in ounces produced, the output of silver for the first 9 months of 1918, if maintained for the balance of the year, will probably equal in value that of any other year in the history of the Cobalt camp. The average New York price of the metal for the period was 95.21 cents per fine ounce, the present price of silver being 1.01½. Mines shipping 750,000 ounces or over are given in order: Nipissing, Mining Corporation of Canada, Kerr Lake, O'Brien. Shippers this year to date include mines that have been idle for some time. Some of these are: Edwards & Wright, Ltd., operating the Green Meehan at North Cobalt; the Silver Eagle and Keeley mines, in South Lorrain, and Peterson Lake. Many of the mines are now treating slimes and tailing dumps by flotation methods.

Nickel-Copper.

The only copper ore shipment was a trial lot by the Hudson Copper Co., of Havilah. High operating costs, increased freight rates and smelter charges, and lack of a customs smelter within the province contribute to make copper mining unprofitable at the present time. As a result of the operations at the new Port Colborne refinery of the International Nickel Company of Canada, there was a production of metallic nickel and copper from nickel-copper matte. The refinery started last July, and up to the end of September had produced 358,205 lbs. of nickel and 359,713 lbs. of copper. The Copper Cliff and Coniston smelters treated 1,141,089 tons of ore, producing therefrom 64,926 tons of matte containing 33,688 tons of nickel and 17,232 tons of copper.

Iron Ore and Pig Iron.

During the first nine months of this year 154,243 tons of iron ore were shipped. Of this total, 84,886 tons were shipped to Ontario points and 69,357 tons outside the province. In addition to the output of the Algoma Steel Corporation and Moose Mountain, Ltd., shipments were made by the Poe Mining Co. from Palmerston tp., Frontenac county and by the Canadian Union Iron Mines Corporation, from Drummond township, Lanark county.

Pig iron production came from 1,083,456 tons of ore smelted, of which only 87,106 tons were of Ontario origin. Although the tonnage of pig iron produced was only slightly in excess of the 1917 figures, the value shows an increase of nearly 50 per cent. Eight furnaces were in blast, operated by four companies. The steel production was 668,333 tons worth \$21,601,144. As a result of the war's ending, the character of the output will be changed almost immediately from shell steel to structural steel and rails.

Lead.

Production of pig lead was in excess of the 1917 output but a decline in price is reported. The only mine and smelter operating is that of the James Robertson Estate at Galetta, on the Ottawa River. The entire product is shipped to the headquarters of the company at Montreal.

Molybdenite and Ferro-molybdenum.

The output of molybdenite concentrates shows a decrease. Molybdenum is one of the war metals, and as a result of the armistice the demand has declined. Early in the year the International Molybdenum Co., of Orillia, and the Tivani Electric Steel Co., of Belleville, produced ferro-molybdenum to the extent of 19,410 lbs. worth \$59,153. Electric Foundries, Ltd., of Orillia, produced in experimental work 1,800 lbs. of ferro-manganese. This last-mentioned company and the Tivani company are now engaged in the electric furnace production of low phosphorus pig iron.

GRANBY HONOR ROLL.

In honor of the 400 or more men of the Granby Mining & Smelting Company, who have joined the allied forces, the Granby Company is preparing an honor roll to perpetuate their memory. The tablet, which is a handsome work of Corinthian design in fumed oak, standing over four feet high, is to be placed in the company's Vancouver office. It will be suitably framed and colored photographic enlargements will be on view at each of the company's plants. The scroll at the top of the cornice shows the Union Jack, Canadian Ensign and Old Glory entwined with a Maple Leaf in the centre, all brought out in colors. A large inset picture in the centre of the tablet by the English artist, Herbert Schmatz, entitled "Banners of Empire," depicts the Canadian Regimental Flags lying on General Wolfe's tomb in Westminster Abbey, while the men are fighting in France. Beneath the picture is a glass cabinet containing the honor roll, a dark green morocco-bound book divided into six sections, representing the company's six plants at Anyox, Alaska, Cassidy, Grand Forks, Phoenix, and the Vancouver office. A separate loose leaf bears the record of each individual, giving particulars of his name, family record, date of enlistment, history of his services with the company, his department, age, military record and battalion. Of the 400 or more Granby employees who have responded to the call, between twenty-five and thirty have been killed and nearly one hundred have received serious wounds.

LA ROSE ACQUIRES HOMESTAKE SILVER MINE.

The Homestake silver mine, one of the best-known old mines of British Columbia, has been sold to the La Rose Mining Company, of Cobalt. This is the second Cobalt mining company to enter the mining field of British Columbia recently, the Mining Corporation of Canada having recently acquired and now being engaged in the development of the Woolsey property near Revelstoke, B.C. The Homestake was disposed of by Mr. Byron R. Jones and associates, of Vancouver, who had secured the property under option. This mine was operating twenty-two years ago, but its owners at that time, a Vancouver syndicate, although its silver values were high, were unable, under the processes then in use, to extract more than a little over 70 per cent. For this reason the working of the property, having been found unprofitable, ceased. With the oil flotation process and the high price of silver, the Homestake

will be placed among the producers again, its new owners being convinced that, as a result of the changed conditions, it will prove to be a first-class investment. Mr. H. D. Cameron, a nephew of Sir Douglas Cameron, former Lieutenant-Governor of the Province of Manitoba, will be in charge of the work. The Homestake is situated in the Kamloops Mining Division of British Columbia, approximately 18 miles from the Canadian Northern Pacific Railway and at an elevation of about 2,600 feet. It consists of four Crown-granted mineral claims, of 191.44 acres. A tunnel 190 ft. in depth has been sunk.

Mr. Robert R. Hedley, a well-known mining man of Vancouver, B.C., is superintending the operation of the Mary Reynolds mine of Yale District. This is a gold-silver proposition and Mr. Hedley expects to arrange for the installation of a mill next summer. He looks forward to developing, in a short time, an output of between two and three carloads of ore a month.

Mr. James Errington has obtained an option on the group of claims known as the Aspen Grove Property, a low-grade copper proposition, which is situated in the Kamloops Mining Division, B.C. There are seventy claims in this group and an engineer has been engaged to make a report on the whole property. Drilling is expected to commence in the spring of next year.

One of the most important public works undertaken by the Mines Department of British Columbia with a view to opening up a promising mineral district to development is the construction of what is known locally as the Big Bend Road, which runs from the City of Revelstoke north along the Columbia River. The country in this section, generally speaking, is rough and mountainous and it has been and is (as the work is not yet finished) an expensive and, to the engineers engaged, a somewhat difficult work. The road now is open to La Forme Creek, in which locality are situated a number of mining prospects from which much is expected.

From the Chu Chua section of the North Thompson River, British Columbia, comes the report of another rich gold strike. A sample taken from the discovery was displayed at Kamloops, B.C., which, it is estimated, would run from \$25,000 to \$40,000 a ton in gold values. Henry Skenig is the locator. He is just back after spending a year at the claim. He says he has run a tunnel 87 feet and stripped the lead at points for about 12,000 feet, and has also run crosscuts at several points.

It is stated in Vancouver, B.C., that despite the efforts of the United States authorities at the border, American gold still is coming into Canada for barter and exchange, especially among the Chinese who pay as high as 35 per cent. premium for coinage. This, in turn, it is claimed, is shipped out of Canada to the Orient. During recent months the price for gold among the currency gamblers in the Oriental section of Vancouver has increased from 10 to 35 per cent. It is said that large sums of gold are held in Chinatown awaiting the opportunity of shipment to China. One man who has sold considerable coinage to Chinese speculators is said to have made the statement recently that several months ago he got only \$22 for a \$20 gold piece but now he could get \$25.50.

BRITISH COLUMBIA'S COAL OUTPUT.

A statement prepared by the Provincial Department of Mines, showing the coal production in British Columbia for the first nine months of 1918 is of special interest because of the special efforts made to maintain a high output notwithstanding many and unusual difficulties. The figures issued show an aggregate increase of 255,188 tons; not very considerable when viewed from the broad standpoint of American production, but, to the operators concerned, very satisfactory because it has been accomplished in the face of problems which appeared insuperable at the moment but each of which has been successfully dealt with. Of course, the scarcity of labor has been a factor which has confronted the collieries ever since the war started and costs also have been steadily advancing. But it was not alone these that the operators of Vancouver Island were called upon to overcome. They found that in some cases their most reliable workings were becoming exhausted and had to develop new mines to take their places. And there have been, and are, other difficulties, as will be shown.

The Canadian Collieries (D), Limited, found it necessary to abandon No. 4 Mine Extension comparatively early in the year. This, however, was not allowed to interfere with production any longer than could be helped. It was decided to open a new mine, No. 5 South Wellington, which has been on the shipping list for some time and is making a good showing.

The Pacific Coast Collieries Co., Ltd., had to close Nos. 1 and 2 Slopes, South Wellington, but it concentrated on Nos. 3 and 4 Shafts, Morden Mine, which have been doing exceptionally well.

The British Columbia Coal Mining Co., whose Jingle Pot mine figures strongly in the output statistics for 1917, was closed by order of the Chief Inspector of Mines early in the year owing to the discovery of a fire which threatened to be serious. It remained sealed for months, representing a very serious loss to the Island output. However, it now has been re-opened and its daily tonnage is advancing steadily.

If there had not been something to offset all this the figures given at the outset would be impossible. There have been, fortunately, compensating features, one of the most notable perhaps being the splendid production of the Harewood Mine, Canadian Western Fuel Co., as well as the very satisfactory manner in which the operation of the No. 1 and Reserve Mines, of the same company, has been speeded up. Then there have been additions to the ranks of the collieries, some of which already have begun to count and others of which still are in the development stage. These include the Granby Consolidated Mining and Smelting Co.'s mine at Cassidy's, V.I., which promises to be one of the finest coal mines of Western Canada in point of plant and general equipment and which is materially swelling the monthly production statistics. Also, there is the new Wakesiah Mine, Canadian Western Fuel Co., at Nanaimo, which is expected to be in operation in the course of a few weeks and the output capacity of which is placed, by conservative estimate, at 150,000 tons per year. Its development will represent an expenditure of about \$200,000. The Nanoose Collieries, also, is doing some development which will have an important bearing on the productiveness of the Vancouver Island fields in the future.

Details of the output for the first three-quarters of 1918 follow

Island Fields: 1917, 1,275,147 tons; 1918, 1,277,847 tons. Increase, 2,700 tons. Crowsnest Fields: 1917, 350,180 tons; 1918, 572,010 tons. Increase, 221,830 tons. Nicola-Princeton: 1917, 106,158 tons; 1918, 136,816 tons. Increase, 30,658 tons. Total increase, 255,188 tons.

It will be noted that the most marked increase was in the Crowsnest, which is explained by the fact that the mines of Fernie, Michel, Corbin, etc., worked constantly, turning out a steadily increased tonnage, until the strike occurred over the introduction of the Single Shift System in the two former mines. As the labor trouble of 1917 in this district took place early in the year the difference is clear. If there had been no Single Shift Strike, there would have been a further increased tonnage of at least 60,000 tons. As it was, the September returns showed a slump of 75,777 tons over those of August. Another contributory cause for this was the Nanaimo cable accident.

It may be remarked incidentally that the Royal Commission to be appointed to make inquiry into the necessity for the Single Shift in Fernie and Michel has not yet been named, because the miners have been unable to nominate their representative. The inquest into the circumstances of the death of the Nanaimo miners is still in abeyance. The latter awaits the report of Provincial Mineralogist W. Fleet Robertson, who went to McGill University with parts of the broken cable to carry out a series of physical, chemical, microscopic and other tests with a view to revealing the cause of the accident. From Montreal comes the report that the fracture shows that, while the outside strands of the rope were flawless and apparently as strong as ever, the centre or core for a certain distance had been affected by rust. The origin of this rust and the reason of its localization to a limited length of the rope where the fracture took place has yet to be explained.

To revert to the question of production, there now is some speculation as to what the returns for the remainder of the year will show. While all the October figures are not to hand, enough have been received to show that that month cannot be expected to make a particularly good comparative showing. The ravages of Spanish influenza have been felt by the miners of British Columbia to a greater extent than workmen in other lines of activity. It is known that the Canadian Western Fuel Company's output for October was 59,219 tons. This was for 27 working days. Compare that with 61,200 tons for September in which there were 25 working days and the effect of the "flu" to that particular colliery is apparent. It has made a difference of approximately 300 tons a day. The same conditions prevail at Fernie, where the production, normally 2,500 tons daily, is reported to have dropped to 500 tons a day. Michel, it is said, escaped the disease to a large extent by becoming a closed town, trains passing through with locked doors and no strangers being allowed ingress.

However, with the "flu" checked, which should soon be accomplished, conditions now are fairly propitious and British Columbia may wind-up the year 1918, after all, with a good margin over the preceding year in respect of coal output.

The Telkwa Coal Basin.

Some of the coal deposits of Northern British Columbia are being developed, that which now is receiving attention being the Telkwa Coal Basin, situated about 35 miles from Telkwa on the line of the Grand Trunk Pacific Railway. Three drill holes have been

sunk and, according to the engineer's report, it has been established that there are 50,000,000 tons of good bituminous coal available in this particular section. Experiments seem to indicate that it will prove to be good coking material, but the coal has not yet been given a practical trial. The most serious difficulty confronting the promoters is the question of transportation, the construction of a branch line connecting with the G.T.P. being necessary. This is a matter which is being dealt with now, and if the financial support necessary for the work is secured, this coal will be exploited.

DECISION IN FAVOR OF COAL OPERATORS ON VANCOUVER ISLAND.

The British Columbia Court of Appeal has handed down judgment in favor of Mr. H. W. Treat and his associates as against the E. & N. Railway Co., in the suit brought by the latter to have the defendants—Messrs. Treat et al—declared trespassers on certain coal-bearing lands on the foreshore of that block of land known as the E. & N. Land Belt, Vancouver Island. This confirms the opinion of the lower court and affirms Mr. Treat's title to the lands in question, which are situated near the mouth of the Chemainus River between Victoria and Nanaimo, B.C. It means that the courts hold the view that the Dominion Government had no power to convey foreshore rights to the railway company when bonusing it, by a considerable land grant, for the construction of the road. It means, also, that the development of the coal in question will proceed without interference and that others, holding provincial licenses to coal areas on the foreshore of the island and within the belt, probably will take steps leading to the development of this part of the coal resources of the island.

The Canadian Northwest Steel Company is building a fuel pulverizer, on plans prepared by the Fuller Engineering Company, for the B.C. Sugar Refinery of Vancouver, B.C. It is expected to cost about \$40,000. This is the first installation of the kind in the Canadian West and for that reason is being viewed with special interest.

ASPEN GROVE AMALGAMATED MINES.

The Aspen Grove Amalgamated Mines, Ltd., of British Columbia, has been formed for the purpose of taking over and operating several large groups of mineral claims in the Aspen Grove District. The property includes sixty claims and has been developed sufficiently to satisfy those interested that they have a splendid deposit of copper. Considerable work is contemplated which, it is stated, will commence at an early date. The officers are: J. A. Bate, president; M. A. Durland, secretary-treasurer; M. L. Grimmett, director and solicitor; Joseph Walters and Dr. J. J. Gillis, directors. The company's headquarters are at Merritt, British Columbia.

PRINCETON MINING AND DEVELOPMENT COMPANY.

A considerable body of ore is blocked out on the property of the Princeton Mining & Development Company near Princeton, B.C., and as a short spur from the Great Northern Railway has been completed shipments to the Granby Smelter at Grand Forks will start without loss of time. It is the intention to work continuously. Assays of the ore average about \$35 to the ton.

DEVELOPING PRODUCER SILVER-COPPER PROPERTY NEAR JEDWAY.

Energetic measures are being taken for the development of the Producers' Mine, a promising silver-copper property situated on Moresby Island near the town of Jedway. Water power is being provided, a ten-inch water pipe driving a 48-in. Kincaid waterwheel. A compressor plant has been imported from Vancouver City. It is proposed driving a 250-ft. tunnel to tap the vein and, if the programme now laid out is carried through, the mine will be on the shipping list by February, 1919. Mr. Frank Buckingham will have charge of the mine operations.

PERSONAL AND GENERAL.

Mr. J. B. Tyrrell has been elected chairman of the Toronto branch of the Canadian Mining Institute.

Dr. R. C. Wallace, Commissioner of Northern Manitoba, is moving from Winnipeg to The Pas, Manitoba, where he assumes his new duties on December 1st.

Mr. E. V. Neelands is in Toronto.

Mr. Charles Williams, of the Hollinger staff, was in Toronto last week.

Mr. J. L. Agnew is suffering from an attack of influenza.

Mr. H. E. Rice has been appointed general superintendent of Dominion Iron and Steel Co.

Mr. A. D. Miles, president of the International Nickel Co. of Canada, is now in the new offices in Toronto.

Major E. F. Pullen has been awarded the Distinguished Service Order Medal.

Lieut.-Col. R. W. Leonard has been elected president of the Engineering Institute of Canada for the coming year.

Mr. R. N. Palmer is at Black Lake, Que.

Major T. R. London has been appointed Commander of the Royal Canadian Engineers in Military District 11, which includes British Columbia and Vancouver Island.

Mr. Chas. Randall has been appointed manager of the Dome Lake Mining Co., Porecupine.

The bulletin on the Radial Coal Cutter, just issued by the Canadian Ingersoll-Rand Company, Ltd., describes the "37" and "47" coal cutters manufactured by that company. The bulletin describes the details of construction and indicates the particular advantages of this type of coal-cutter; briefly, these are the portability and ease of operation, with first cost comparing favorably with that of the standard rock drill. One of the principal features of the machine is the variable stroke, which has been found to be essential for this class of work.

Mr. Thomas Graham, superintendent of the Canadian Collieries (Dunsmuir), Ltd., states that the ravages of the epidemic of Spanish influenza have severely handicapped him in his endeavor to maintain the output of the several mining properties of that company. He asserts that the number of men who have laid off work for periods of varying length during the past few weeks runs into the hundreds. It has been impossible, therefore, to keep production up to the maximum point during the first weeks of November. However, he is hoping that an improvement soon will be apparent.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

The Otisse Property, Matachewan.

The results of diamond drill work done on the Otisse property in the Fort Matachewan district have been satisfactory. This announcement was made authoritatively. So far as can be reasonably ascertained, diamond drilling has indicated the presence of a large body of mill ore. In all, thirteen holes were sunk on the property, which was staked by Sam Otisse and optioned by the Colorado-Ontario Development Company less than a year ago. The results of the first few holes drilled did not prove very satisfactory, but as work progressed, better results were obtained. Operations at the property have now been suspended, pending the arranging of the installation of a mining plant. This will not be attempted until the winter roads are available for hauling supplies to the new district, owing to the fact that freight at the present time costs the exorbitant price of \$90 per ton from Elk Lake, the end of the steel, which compares with a cost of about \$15 per ton over the winter roads. A new \$4,000,000 company has been organized for the purpose of active operation of the property. This is to be known as the Matachewan Gold Mines, Limited. Associated with the new company are the original members of the Ontario-Colorado Development Syndicate, among whom are Charles Flynn, of New York, and C. A. Foster, together with Walter J. Boland, of Toronto.

Camp buildings have been erected on the property sufficiently large to accommodate a large force of workmen. A land road has been cut to within about six miles of Elk Lake, and the remaining six miles can be cut in a short time, thus furnishing satisfactory communication with Elk Lake for the winter months at least. Owing to the fact that the greatest amount of work on any one property in the district has been accomplished on the Otisse, it has formed the centre of interest for the new camp. The Davidson property, which adjoins the former, is the first on which gold discoveries were made in the district, but up to the present it has not been extensively opened up. It, therefore, appears to be evident that the future of the Matachewan area to a large extent hinges on the results met with in the future development of the Matachewan Gold Mines, where ore has been indicated and awaits the actual underground development to prove its extent and importance. Several hundred mining claims have been staked in the district and a considerable amount of surface work has been done by various property owners, therefore the announcement of results achieved in diamond drilling and the assurance of further development work on the leading property in the new gold area will prove a source of much satisfaction to the many property holders.

The Gowganda Road.

Road construction between the end of the railway at Elk Lake and the Gowganda Mining camp has been suspended for the time being. Limited labor, coupled with extremely wet weather, retarded the progress of the work a good deal, in spite of which fact, however, a part of the road has been put in pretty fair shape. The results of mining in the district during the coming winter may be expected to determine to what extent the government will devote its energies to road-building in that district during the coming summer. With the cessation of hostilities, it is expected larger num-

bers of men will be available for this class of work in the future.

Elk Lake Expects a Boom.

Indications point to Elk Lake being the centre of much activity during the coming winter months. In addition to the increased activity in mining circles in the Elk Lake district, operations under way in the Gowganda camp, coupled with indications of another busy winter in Matachewan, provide the reasons for the expected boom. Elk Lake as a silver mining section had the misfortune to be discovered at the time when Cobalt was just nicely under way as a silver camp, with its excellent railway connections. In spite of the fact that some very spectacular shoots of high-grade ore were encountered in a number of places, no real paying mines were developed. However, mining methods have been greatly improved over those prevailing a decade ago, and it is possible that with the added knowledge of geological conditions and better methods of treatment, a number of mines may yet be developed. The Elk Lake field is located some forty miles north-west from Cobalt and the rock formations resemble those of Cobalt with the one exception that the diabase formation predominates. Some conglomerate occurs, but in less extensive bodies than in the Cobalt camp. It is a well-known fact that the largest percentage of silver produced in Cobalt came from the veins in the conglomerate. Exceptions to this rule have occurred, however, as in the case of the Kerr Lake Mine at Cobalt, where immensely rich veins have been found in the diabase. Invariably, however, these veins have been found in close proximity to the contact of the diabase and conglomerate formations. The present high price of silver is added incentive to the various property holders to more diligently search for the precious metal, and there is a strong possibility of their efforts resulting favorably in a number of cases.

A Silver Discovery.

A promising discovery of silver is said to have been made on the Westcott claims in the Township of Tudhope, Elk Lake District, not far from the Toledo property.

Shipping Ore From Foster Mine.

Steady shipments of ore are being made from the old Foster mines at Cobalt. About eight cars per week are being shipped to the Northern Customs mill. Arrangements are being made for increasing these shipments to twelve cars per week, from which it is expected about 4,000 ounces of silver per ton will be produced. During the removal of these dumps a considerable amount of high-grade ore is being encountered and already one carload, estimated to contain about 300 ounces to the ton, has been shipped. The ore is being handled by one man operating a mechanical bucket, and the costs of handling have been reduced to a minimum. In the meantime, underground operations are being carried on at the first level of the mine.

Boston Creek.

Efforts are being made to have the "National" stop at Boston Creek Station. The present passenger service to the new camp is somewhat inconvenient, owing to No. 47 train only running as far as Englehart, necessitating travellers stopping over at Englehart or some point along the line until the arrival of the Montreal train late in the afternoon. This brings passengers to Boston Creek in the evening, making it necessary to make the trip to the outlying mines after night-fall. The "National" passes through Boston Creek three days a week shortly after noon and would provide ex-

cellent service to passengers with this station as their destination.

Developments at the Miller-Independence Mines at Boston Creek are such as to arouse the greatest enthusiasm. The phenomenally rich ore being encountered is causing international interest. The calaverite, which is in spectacular quantities, occurs over a width of several feet. The pay-streak, in which the tellurides of gold occur in exceptionally large quantities, is from four to five feet in width, in addition to which there is from six to eight feet of high-grade milling ore. The management is carrying forward an aggressive policy of underground development, and drifts are being driven at both the 100 and 200-foot levels in two directions. It is also planned to diamond drill several hundred feet ahead of development work.

Will Develop Mondeau Property.

It is learned that the Timmins interests, prominent in mining circles through their connection with the Hollinger-Consolidated at Porcupine, are interested in the development of the Mondeau property in the McElroy township section of the Boston Creek mining camp. The Mondeau is situated in the northern part of what appears to be the richest belt in the Boston Creek district. It is equipped with a small mining plant, and present plans of operation call for the sinking of the shaft to a depth of 100 or 150 feet, for which work additional machinery is being installed. Lateral work will be undertaken at the aforementioned depths. A contract for shaft sinking has been let, and work is already under way. The entry of the Timmins interests into the Boston Creek camp is of considerable importance, showing that the district is looked upon favorably by the leading mine operators of the Dominion. The most important factor to date has been the extensive rich deposits developed on the Miller-Independence property. Evidence continues to accumulate from week to week, however, that the extent of the gold-producing area of the new camp will be large. Discoveries of more or less importance, and worthy of further development, have been made at widely-separated points in the four townships which comprise the Boston Creek gold district, namely: Boston, McElroy, Pecaude and Catherine. The camp is ideally located as regards railway transportation and power, and with sufficient men available for the energetic development of the large number of promising prospects in the district, rapid enlargement is looked for in the mining activities of the camp.

Pittsburgh-Lorrain.

Milling operations at the Pittsburgh-Lorrain property in the South Lorrain section of the Cobalt district have been suspended for the winter months. During the summer and fall the company has employed the oil flotation process with considerable success. The Pittsburgh-Lorrain owns and operates the old Currie property, and also the Wettlaufer mine and mill under lease. The operation of these properties have been the most consistent effort at silver mining in the South Lorrain district in recent years.

Temiskaming Mill Again in Operation.

Developments at the Temiskaming Mine in the Cobalt camp have recently been of a favorable nature. The new vein reported as having been encountered on the Gans lot is showing improvement as work proceeds. It is understood drifting is proceeding both north and

south, and the vein has a width of about one foot. The wall rock is said to carry silver values over the full width of the drift. The mill at the property, which has been closed since last spring, was placed in operation again this week, it being presumed that sufficient ore is now available to keep the plant operating at capacity for a reasonable period. The treasury of the company is in excellent condition, there being upwards of half a million dollars in cash available, in addition to which \$400,000 of the recent Canadian Victory Loan was subscribed for by the company.

Nipissing.

During the month of October the Nipissing Mining Company produced \$278,468, and shipped products from Nipissing and customs ore of an estimated net value of \$545,135. Favorable underground developments were encountered at shaft 73 and at 96 tunnel. A small vein which was encountered in 73 shaft in September, has improved from one inch in width to as high as three and four inches, assaying from 2,000 to 3,000 ounces to the ton. At 96 tunnel a crosscut encountered two soft veins about two inches in width and assaying 1,500 ounces. Elsewhere conditions underground continued to be satisfactory. A winze is being started at the sixth level of No. 73 shaft in order to explore and develop the southeast part of the northern portion of R. L. 401. A promising vein was encountered at the sixth level about two months ago, but it is apparent that more depth is desirable. It is estimated that the depth of conglomerate at that point will be at least 125 feet below the sixth level. The vein is strong structurally, and has other encouraging features. Construction work has been almost completed and sinking is now under way. A new shaft is being started near the centre of R. L. 404, near the edge of Cobalt Lake. There is a large area of undeveloped conglomerate in this vicinity. It is comparatively shallow in depth, however, and the shaft will have a depth not to exceed 125 feet.

A total of 125 tons of high-grade ore were treated, and the refinery shipped 401,423 fine ounces of silver. The low-grade mill treated 6,882 tons. The following is a summary of production:

Low-grade mill	\$120,987
Washing plant	157,481
Total	\$278,468

\$7,624,761 in Ten Months.

During the first ten months of the current year the mines of Cobalt have shipped silver of an approximate value of \$7,624,761. This compares with \$6,070,748 during a corresponding period of 1917, and represents an increase of \$1,554,013, or an average increase of upwards of \$150,000 every thirty days. At this rate the silver output of the camp will exceed that of the year 1917 by almost \$1,900,000. Even with the increased costs of operation, the profits of the various operating companies will be greatly swelled. The 1918 silver production in point of value will establish a record for the Cobalt camp, owing to the fact that the price of the white metal has been abnormally high during the year, as well as the fact that the known ore bodies of the larger producing mines of the camp are being found to extend beyond their previously known limits in almost every case. It is also possible

that new mines will be developed where energetic exploration work is being carried on at a number of properties in the camp. The North Cobalt area is receiving considerable attention at the present time. The installation of an electrically-driven mining plant is under way at the property of the Mining Corporation of Canada on the west side of the track at this place, and excellent results are attending the development of the Green-Meehan mine on the east side of the track. The Mining Corporation has outlined a somewhat extensive plan of operation. The fortunes of the mines of the camp will, no doubt, continue to fluctuate, as has been the case from the beginning. It is not improbable, however, that the working out of one mine may be followed by greater production from others, which will likely continue for a great many years.

Kerr Lake.

The production from the Kerr Lake Mine at Cobalt for the month of October amounted to 200,220 ounces of silver. This compares with 208,339 ounces during the preceding month, and is slightly lower than any previous month of the current year. With the price of silver remaining at slightly over \$1.01 per ounce it is evident the value of the output of the past month is higher than that of the earlier months of the year. The following is a summary of development for the past ten months of the year:

Month.	Ounces.
January	204,641
February	204,153
March	207,100
April	201,000
May	268,213
June	210,000
July	231,000
August	250,400
September	208,339
October	200,220

Temiskaming and Hudson Bay.

The annual meeting of the Temiskaming and Hudson Bay Mining Company, as well as the operating company, the Hudson Bay Mines, Limited, was held at New Liskeard on November 12th. George Taylor, who since the formation of the company has been president and director, retired on account of ill-health. The shareholders expressed regret at Mr. Taylor's retirement, and passed a hearty vote of thanks in appreciation of his long and valuable services as president of the company. The annual reports of both companies will be available in a few days.

The following directors have been elected: For the Temiskaming and Hudson Bay Mining Co., Ltd.—Messrs. A. A. McKelvie, T. McCamus, F. L. Bapst, C. L. Sherill, W. H. Kinch, S. S. Ritchie, and F. L. Hutchinson: Officers: President, F. L. Bapst; Vice-Pres., A. A. McKelvie; Sec.-Treas., F. L. Hutchinson.

Beaver Consolidated.

Continued favorable developments above the diabase sill at the Beaver Consolidated Mines, Cobalt,

are reported, and the expectation that plans are being completed for the opening of the large new mill at the Kirkland Lake Gold Mines, of which the Beaver Consolidated owns seven-eighths of the stock, is serving to attract attention in mining circles. While officials are reticent regarding achievements at the mine, it is understood that no work is being done at the 1,600-foot level, with the exception, perhaps, of pumps necessary to prevent the workings from flooding. Besides completing the purchase of the Kirkland Lake Gold Mines, the Beaver has equipped the mine with a 150-ton mill in addition to developing the ore bodies to a depth of 700 feet. Close to one million dollars in gold ore has been blocked out at this property, which will prove a big asset to the Beaver Company. This large gold mine, new, but proven, added to the Beaver Mine itself, which is still a large producer, lends big value to the Beaver Consolidated.

Rich Ore at Foster Mine.

One of the most notable developments in recent years in the Cobalt camp is the sensational results being met with at the 60-foot level of the old Foster property here. A few weeks ago, shortly after underground work was commenced, a high-grade vein was encountered in one of the old workings. Since this time the drift has been driven about 30 feet in ore, the vein being about three and a half inches in width, and in places carries massive silver, while the average grade of the ore is around five thousand ounces to the ton. In the wall rock leaf silver in chunks, sometimes as large as a man's hand, is found in the seams along the sides of the vein. Already a large amount of this high-grade ore has been bagged, while high-grade ore continues to show along the floor, in the face and roof of the drift. The property is being operated under lease by C. L. Campbell and W. Fairbairn of Haileybury. While the lease will doubtless result in the holders getting large returns, the Foster Company itself will not derive any great benefits from the new discovery, the lease calling for the company to receive but ten per cent. of the "profits" of the operation. Besides the successful working of the underground portion of the mine, the dumps are being sent to the Customs Concentrator at 104, and about 4,000 ounces of silver per week is being recovered from this source, while also a fair amount of high-grade ore has been found in the work of removing the old ore from the surface dumps.

Adanac.

The vein at the 310-foot level of the Adanac Mine ranges in width from 18 to 30 inches, and the silver values in the face of the drift range from 100 to 400 ounces to the ton. At the point where the vein was cut several weeks ago, the grade of ore was comparatively low. However, since drifting was commenced, a steady increase has been recorded, with assays of 395.60 ounces showing in the last few rounds. The composition of the vein is smaltite, niccolite, calcite and silver, the smaltite and niccolite constituting the greater percentage of the vein matter. A crosscut is also being driven to the east to cut the series of veins which parallel that along which the drift is being made. Early this week one of these veins was cut, in which considerable leaf silver occurs. The wall rock also contains visible lead silver. Altogether, the result of operations appears to be very satisfactory with excellent possibilities of early improvement.

Restakes Disputed Property.

The disputed ground along the boundary line of the Violet property of the La Rose and that of the O'Brien Mining Company, has been restaked by Mr. G. E. H. Booth of the La Rose Mining Company. This seems to point toward the belief on the part of Mr. Booth that the disputed ground is indeed outside the limits of the Violet Property of the La Rose and also that of the O'Brien Mine. The incident is unique in the history of mining in this country, in that, if the staking is in Mr. Booth's behalf, it would take from the La Rose (the company with which Mr. Booth is associated) a large part of their main workings on the Violet; or if the staking is for the company with which Mr. Booth is employed, the company is then staking its own shaft.

Schumacher Gold.

At a special meeting of the Schumacher Gold Mines, Limited, held immediately before the annual meeting of the company, a number of interesting statements were made by Mr. F. L. Culver, Vice-President of the company, who occupied the chair in the absence of the president. He said it was the intention of the management to sink the main shaft ultimately to the 1,000 or 1,200-foot level. The mill, he added, had a capacity of 180 tons per day, and a small addition to the machinery would readily increase this capacity to 300 tons. The Schumacher Mine is situated adjacent to the Hollinger Consolidated Gold Mines and the McIntyre-Porcupine. Extensive ore bodies have been opened down to a depth of 700 feet. The announcement that development to the 1,000 or 1,200-foot level had been decided upon by the management lends still further to the importance of the operation. The mill on the property is the third largest gold ore-treating mill in Northern Ontario. A by-law was passed authorizing the sale of 100,000 shares of treasury stock of the company at a discount of not more than 55 per cent.

Sittings Postponed.

Owing to the prevailing epidemic of influenza in this portion of Northern Ontario, Mining Commissioner T. E. Godson, K.C., has decided to postpone the sittings listed for hearing in Haileybury in December. The postponement will be until some time in January.

Ophir.

The Mining Corporation of Canada has notified the Ophir management that the option on their property by the former company will be dropped on the 14th of December next. It is stated that Ophir interests have made arrangements for continuing the work, as they do not consider the veins have been adequately tested.

Lake Shore.

In his regular monthly report to the directors of the Lake Shore Mines, Limited, at Kirkland Lake, Manager R. C. Coffey points out that the mill treated 1,875 tons of ore and recovered approximately \$45,000 in gold. Both the tonnage treated and the value of gold produced are a new record for the Lake Shore. The following is a summary of the development work for the month: 200-foot level—The crosscut on No. 1 vein was advanced from 160 to 180 feet east. The east drift on the No. 2 vein was advanced from 28 to 107

feet. A diamond drill hole was started south from the No. 2 vein and advanced to 252 feet. 400-foot level—The south branch of No. 1 vein east was advanced from 265 to 322 feet. The north branch of No. 1 vein west was advanced from 259 to 263 feet. At 270 feet on the south branch a crosscut was driven to connect up with the north branch, the distance being 19 feet. Work on the No. 2 vein east was carried from 296 feet to 386 feet, and a crosscut was driven 23 feet.

Hill Gold Mines.

It is understood that operations at the Hill Gold Mines, in the Painkiller Lake section of the Munroe Gold district, is making arrangements for the commencement of operations. It is also stated the company has succeeded in securing control of additional property adjoining. A mill was in the process of installation when the work was suspended.

Elliot-Kirkland.

It has been decided to continue the main shaft of the Elliott-Kirkland property to a depth of 600 feet. The results met with at the 500-foot level did not prove as encouraging as had been hoped, and after diamond drilling at this point it was decided better conditions existed at the 600-foot level than at the 500, and accordingly the shaft is to be continued to that depth.

Installing Mill at Burnside.

The work of installing the milling equipment at the Burnside property at Kirkland Lake is being rushed in the hope of placing the mine on a producing basis by the end of the current year. It is anticipated that with the ore already developed on the property, and the treatment of the material in the 25-ton mill will provide sufficient funds for the extensive enlargement of the milling plant, which present indications appear to warrant in the not distant future. With the prospect of shortly being able to secure all the labor necessary for carrying on operations at full blast, the mill is being completed at an opportune time.

Important Developments on Cotter Property.

Important developments are taking place on the Cotter property in the Boston Creek district, where a vein some three feet in width and carrying tellurides has been opened up on the surface at a point near the southern boundary of the property. The vein runs about east and west and has a dip of about 40 degrees to the north. Meantime a diamond drilling campaign is being carried out some distance to the north, where the eastward continuation of the Miller-Independence vein is being explored. The drill is understood to have cut the vein at depth where about six feet in width of ore has been indicated. Some of the vein matter contained visible gold. With the big vein of the Miller-Independence dipping about 65 degrees to the south and the new vein found on the southern part of the Cotter dipping to the north, it would appear probable that the two orebodies would merge at depth. Everything considered, the extremely unfavorable weather and accompanying difficulty in transporting machinery and supplies to the property, as well as inability to obtain fuel, the results achieved at the Miller-Independence, the Cotter, the Cullen-Renaud and other nearby properties, the camp is gradually working into a very important place, and outside interest is steadily increasing.

Dome Mines.

The resumption of milling operations at the Dome Mines early in the new year is now considered a possibility in well-informed circles. The underground workings of the mine have been placed in a satisfactory condition to best meet the demands of the 1,300-ton mill. Not only is this the case, but it is also learned that so favorable have been the developments at depth, that besides adding greatly to the ore reserves of the mine, the average grade of ore to be treated will be higher. With ample cash available and a large tonnage of good grade ore available for treatment in the mill at once, some 400,000 tons of \$5.10 ore being already mined in a shrinkage stope at the property, it is believed but a short time will elapse before the mine is placed on a footing quite as profitable as pre-war days.

Imperial.

It is reported that the Imperial Mine is being dewatered, preparatory to a thorough examination by the McIntyre-Porcupine. During the early days of the camp the Imperial attracted a good deal of attention. Surface indications were promising, a number of quartz stringers in a large dike containing visible gold.

Chromite in Reaume Township.

An encouraging deposit of chrome has been opened up on a group of claims in the Township of Reaume, some six or eight miles southwest from Cochrane. The result of work carried on during the past summer is said to have opened up fair possibilities. The district is easily accessible by water route from the Transcontinental, being situated immediately west of the Frederickhouse River.

Gold Lake Company.

The Gold Lake Mining Company, with its head office in Toronto, has been formed for the purpose of operating a property in the southern part of the Township of Deloro, in the Porcupine district. The company own nine claims situated near Gold Lake. A number of men are now engaged in road work, and camp buildings are being erected.

Prospecting in Langmuir Township.

Excellent results are said to have attended exploration work on a group of fourteen claims situated in the Township of Langmuir. It is stated that a wide vein has been opened up for a distance of about 200 feet, in which pyrrhotite and chalcopyrite is present in what is believed to be commercial quantities.

Bonsall Property, Gowganda.

According to word from Gowganda, work has been suspended on the Bonsall property, which is controlled by M. J. O'Brien and Sir Clifford Sifton. Results are said to have been reasonably satisfactory.

BRITISH COLUMBIA

Queen-Kootenay Belle Consolidation.

The Queen, Vancouver, Kootenay Belle and Alexandra Mining Groups, situated on Sheep Creek, Nelson (B.C.) Mining Division, have been consolidated under

control of Mr. A. W. McCune, of New York. For some time it has been the opinion of mining engineers that these properties to be successfully operated would have to be placed under one management. This having been accomplished, it is believed that their joint output should be very materially increased. Sheep Creek has been a producer of gold since 1900. The Queen Mine was a producer from 1900 up to two years ago, when, as a direct result of labor difficulties, operations were suspended. In that time the camp produced gold to the amount of about \$2,500,000, of which the Queen was responsible for \$1,312,654 and the Kootenay Belle, \$104,972. Work has been commenced upon the portal of a 3,000-ft. crosscut commencing at the Malwaaz (one of the claims) and running southeast across the several properties to the Alexandra, which will cut several parallel veins. The new pipe line from the compressor to the new portal is also under way. About 25 men are being employed and this number will be increased to 200. New development will entail an expenditure of over \$200,000. The erection of a 200-ton mill, replacing the old Queen mill, is contemplated and buildings are being remodeled and renovated. A power line and telephone service with the City of Nelson are being arranged for. The manager in charge is Mr. Marcus M. McCune.

Mr. John Hopp, the operator of the largest placer ground areas of the Cariboo District, British Columbia, has come to the Coast from the interior and states that, because of the late spring and early summer of 1918, the gold production of that camp will be considerably reduced in comparison with that of 1917. Mr. Hopp asserts that it has not been possible to carry on new development to the extent necessary because of lack of labor and of capital. The difficulty in securing men, together with the general high costs and the fixed value of gold, has held the operators back seriously. Investors, Mr. Hopp explains, have shown little interest in such propositions as that offered by the placer gold fields of the Cariboo. He is looking forward, however, to better times with the coming of peace.

B.C. Mines Department Lets Contract for Diamond Drilling.

The International Diamond Drill Contracting Company, of Spokane, Wash., has been awarded a contract by the Minister of Mines of British Columbia for 10,000 lineal feet, more or less, of drilling on the Snowstorm Group of Copper-Silver-Gold Claims, situated in Highland Valley, Yale District. This is the same company that has been engaged in the development of the deposits of Copper Mountain for the B.C. Copper Company and the Canada Copper Co., for which concern it drilled a total of 100,000 feet. The Government work will start without loss of time.

STANDARD SILVER-LEAD.

The Standard Silver-Lead Mining Co. during the month of June last netted \$16,137 in profits. At the close of that month the company's surplus was increased to \$203,112. These figures offset the report for the month of May, when there was a loss of \$6,272. The change from loss to profit is explained by the receipt of \$41,917 on operating account in June, as compared to \$21,720 in the previous month, the items of June including \$35,809 from zinc sales and \$3,059 in final settlement of sales for April.

MARKETS

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.

Cobalt oxide, grey, \$1.65 per lb.

Cobalt metal, \$2.50 per lb.

Nickel metal, 45 to 50 cents per lb.

White arsenic, 12 cents per lb.

Nov. 26, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 10½ cents per lb.

Lead, 10¼ cents to 10½ cents per lb.

Antimony, 14 cents per lb.

Copper, casting, 28 cents per lb.

Electrolytic, 29½ cents per lb.

Ingot brass, yellow, 21 cents; red, 26 cents per lb.

Nov. 26, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$12.00 per ton.

Coal, bituminous, nominal, \$9.50 per ton.

NEW YORK MARKETS.

Copper—Fixed for the period August 7, 1918, to January 1, 1919, at 26 cents per lb.

Tin—Prices are nominal. Supply is controlled by the American Iron and Steel Institute.

Silver—The U.S. Treasury announced on Aug. 15 that the maximum price was fixed at \$1.01½ per ounce.

Lead—The producers' price is 8.05 cents per lb.

Zinc—Market dull, 8 to 8½ cents per lb.

Aluminum—Fixed at 33 cents per lb.

Silver—101½ cents per ounce.

Molybdenite—\$1.00 to \$1.10 per lb.

Pyrites—30 to 40 cents per unit.

STANDARD MINING EXCHANGE.

J. P. Bickell & Co., report the following quotations on the Standard Stock & Mining Exchange, as of close, November 25th, 1918:

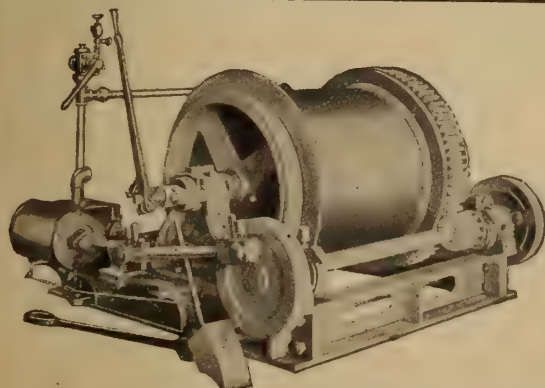
Gold.	Asked.	Bid.
Apex .....	.035%	.03¼
Boston Creek Mines .....	.39	.35
Davidson Gold Mines .....	.72	.70
Dome Extension .....	.25½	.25¼
Dome Lake .....	.19	.18
Dome Mines	13.25	12.50
Eldorado .....	..	.01
Elliott Kirkland .....	.36	..
Gold Reef .....	.02	.01
Homestake .....	.50	.45

Hollinger Cons.	6.25	6.20
Inspiration .....	.02½	.02
Keora .....	.09	.08
Kirkland Lake .....	.49	.48½
Lake Shore Mines, Ltd. ....	.91	.90
McIntyre	1.75	1.74
Moneta .....	.14	.13
Newray Mines, Ltd. ....	.18	.17
Porcupine Crown .....	.26¾	.26¼
Porcupine Imperial .....	.03	.02¾
Porcupine Tisdale .....	.02	.01½
Porcupine Bonanza Mines .....	.04	..
Vipond .....	.25	.21
Preston East Dome .....	.04¼	.03¾
Schumacher .....	.34	.33½
Teck-Hughes .....	.31	.27
Porcupine V. N. T. Gold Mines .....	.25	.20
Thompson Krist .....	.07	.06
West Dome .....	.14¾	.14¼
Wasapika Gold Mines, Ltd. ....	.50	.46

Silver.

Adanac Silver Mines, Ltd. ....	.10½	.10¼
Bailey .....	.05	.03½
Beaver Consolidated .....	.40	.39
Chambers-Ferland .....	.15	.12½
Coniagas	3.50	..
Crown Reserve .....	.25	.23½
Foster .....	.05	.04¼
Gifford .....	.03½	.03
Great Northern .....	.04	.03¼
Hargraves .....	.02¾	.02½
Hudson Bay .....	..	20.00
Kerr Lake	6.25	..
La Rose .....	.36	.35¼
Lorrain Con. M., Ltd. ....	.02	.01
McKinley-Darragh-Savage .....	.48	.47½
Mining Corporation of Canada	2.75	2.60
Nipissing	9.00	8.60
Ophir .....	.04¾	.045%
Peterson Lake .....	.09½	.08¾
Silver Leaf .....	.01	..
Temiskaming .....	.32	.30
Trethewey .....	.24	.22
Wettlaufer .....	..	.04
York Ontario .....	.01	.00½

The Rossland Mining Camp of British Columbia has been severely hit by the Spanish influenza epidemic. The mines have closed down and even the daily newspaper of the town has ceased publication.



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MR. JUSTICE MURPHY'S DECISION IN RELIEF ACT CASE.

Does the Relief Act covering licenses on coal and petroleum lands, passed by the Legislature of British Columbia in 1915, automatically protect from relocation, coal and petroleum lands upon which license fees have become due, but have not been paid, subsequent to August 1st, 1914? This in effect is the pleading of the Minister of Lands in the action brought against the Minister by Messrs. Harding, Johnston and Gillespie. Mr. Justice Murphy, of the Supreme Court of British Columbia, has decided against the Minister, but it is understood that the case will be appealed.

Some years ago, coal prospecting licenses numbered 9852-3-4 were applied for and secured. The claims are on the North Thompson River, in the vicinity of Kamloops. On the 17th day of May, 1914, the annual fees were paid, keeping the title in good shape until May, 1915. Under the Relief Act mentioned above, application was made in July, 1915, for relief against forfeiture as the current year's fees had not been paid. At the time, no relief was granted, but a suggestion came from the Minister of Lands to the effect that a proportionate amount of the fees would be accepted. This suggestion was not acted upon. On the 18th day of February the lands were located by Freeman Harding, James Garfield Gillespie and William Henry Johnston, who subsequently gave the requisite 60 days' notice of intention to apply for licenses, duly published the notice in the Gazette and a Kamloop's newspaper, and applied to the Minister of Lands for their licenses, which application was refused.

A protest was entered, and on the 9th day of May the Minister of Lands referred the matter to the Cabinet Council, who sustained his decision, and on the 23rd day of May the new applicants for licenses gave notice of appeal to the Supreme Court.

Meanwhile, that is to say, on March 21st, the original license holders paid to the Department one year's fees, namely, \$300.00, and an Order-in-Council was passed on the 31st day of May, extending relief to the original holders for the balance of the fees. In the action against the Minister of Lands, the old licensees were not made parties to the trial, although the judge said they should be given an opportunity of hearing. Mr. A. M. Whiteside, of Vancouver, was present, representing the assignee of a portion of the claims, but as he had not received instructions for all the old license holders, Sir Charles Tupper, for the plaintiffs, successfully prevented his argument being heard.

A conference of miners of District 18, which includes the eastern section of British Columbia and the Province of Alberta, will be held on January 6th to discuss problems relative to coal mining operations within the limits of that section and the men's attitude toward the same.

There is some doubt as to what the Munition Resources Commission of the Dominion of Canada proposes to do in regard to the continuance or the discontinuance of the work of prospecting for platinum now in progress on the Tulameen River, British Columbia. At the time of writing, this activity continues. A No. 3 traction Keystone drill, complete with tools and accessories, is in operation. Whether it will be maintained throughout the winter, now that the pressing war need for this metal has passed, is a question being asked by those interested.

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PROVINCE OF ONTARIO



Ontario's Mining Lands

Ontario, with its 407,262 square miles of area contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to \$11,486,167.45 for gold mining companies, and \$70,821,829.34 for silver mining companies, or a total of \$82,307,996.79.

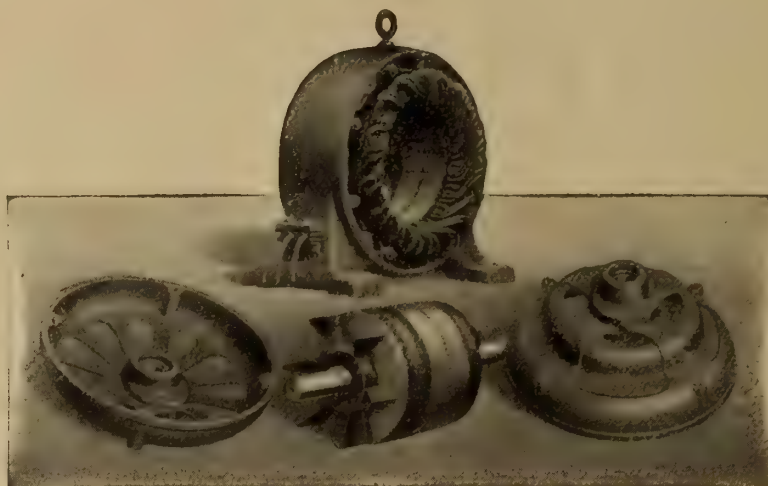
The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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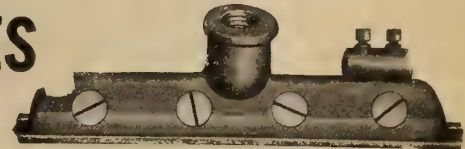
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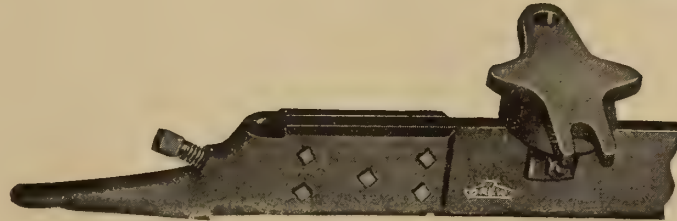
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PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

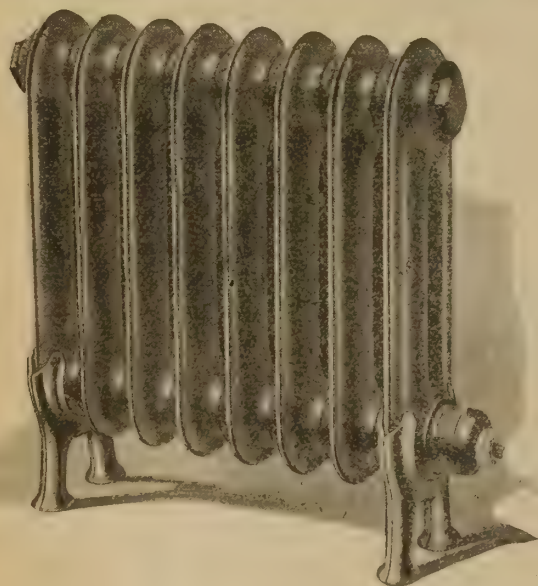
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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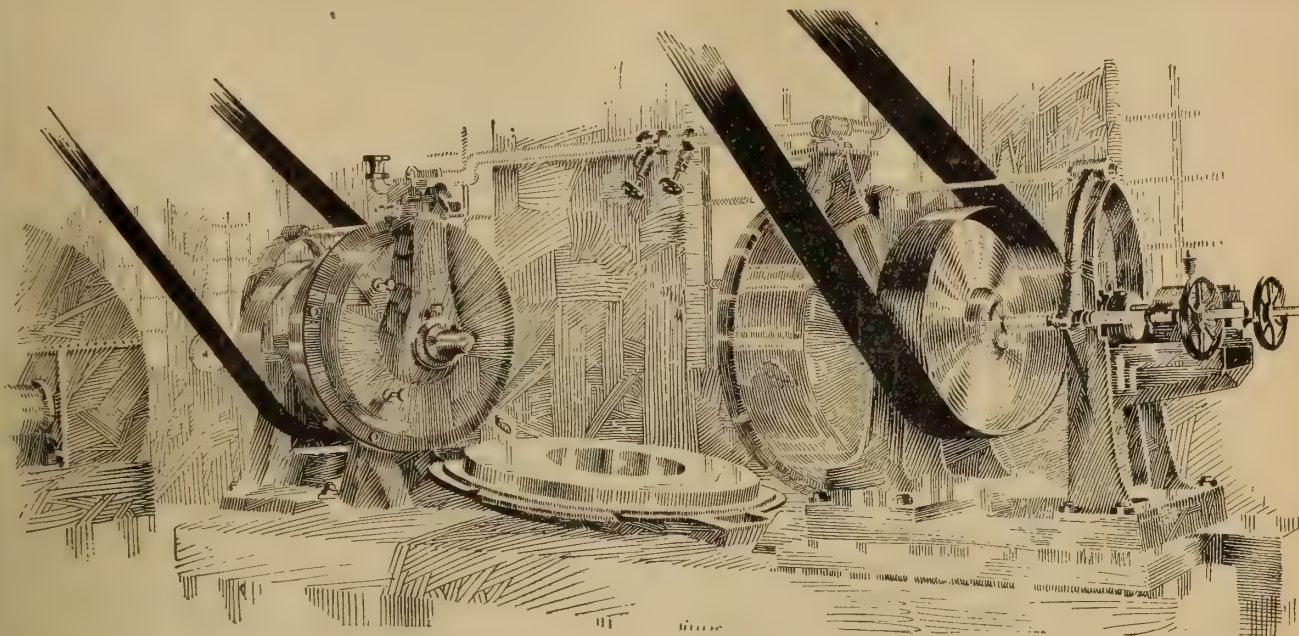
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MINES BRANCH

Recent Publications

- Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.
- Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.
- Summary Report of the Mines Branch, 1916.
- The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.
- The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Summary Report, 1917, Part D. Reports on field work in Manitoba.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.
- Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.
- Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.
- Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.
- Map 135A. Lower Churchill river, Manitoba. Geology.
- Map 145A. Timiskaming county, Quebec. Geology.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.
- Map 165A. Windermere, Kooteney district, B.C. Topography.
- Map 174A. Blairmore, Alberta. Topography.
- Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.
- Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Map 1690. Whiteburn Gold District, N.S. Geology.
- Map 1702. Klotassin, Yukon Territory. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

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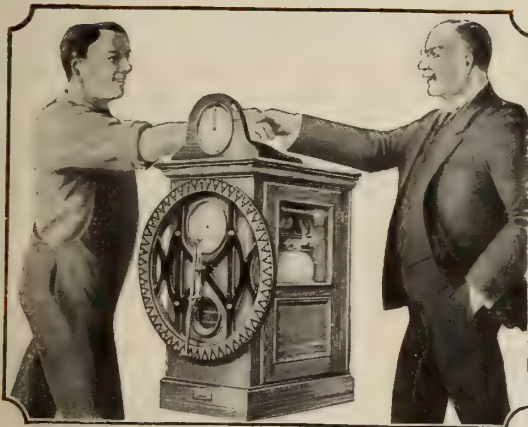
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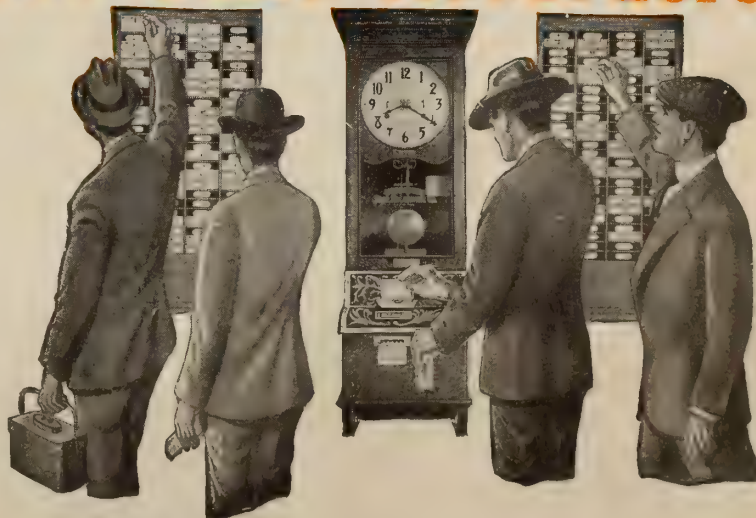
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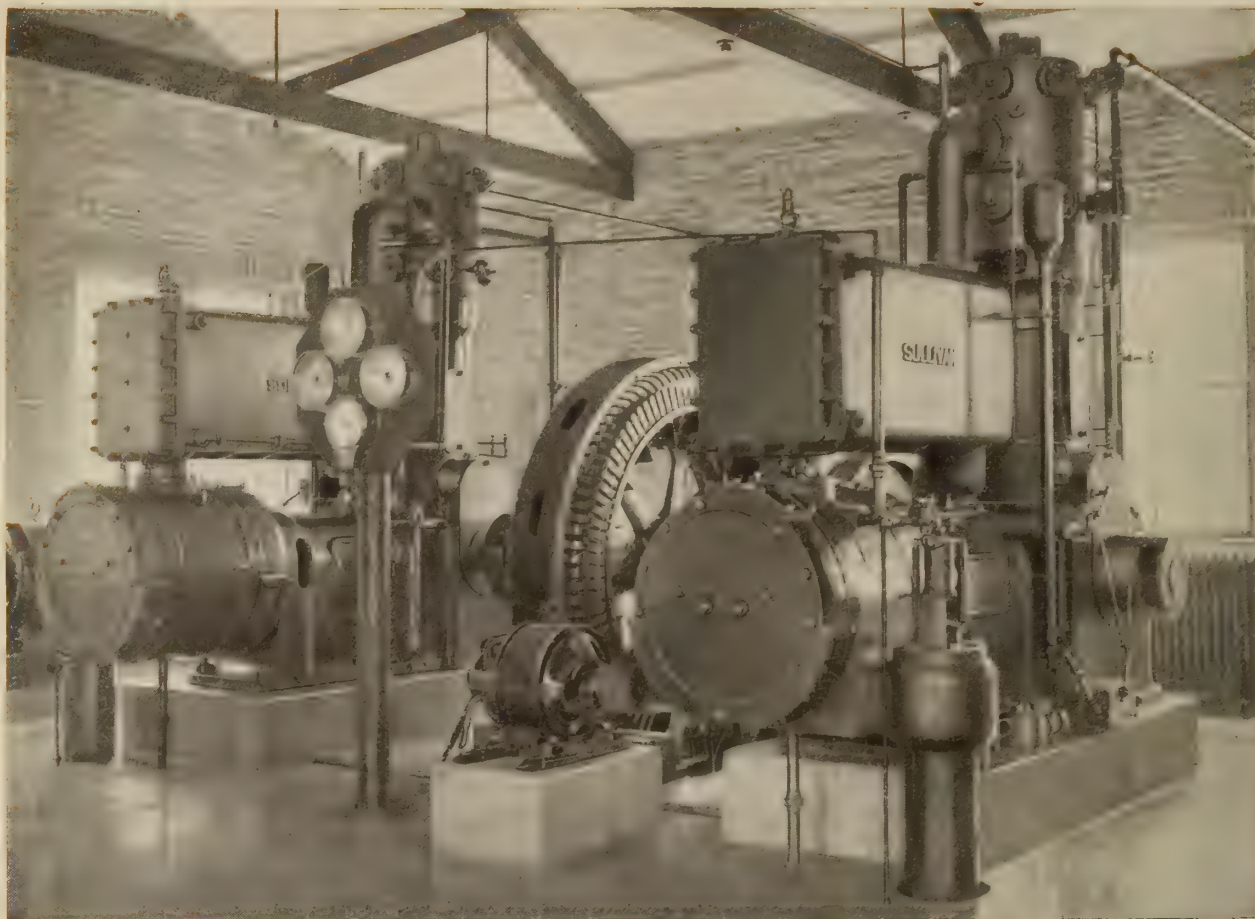
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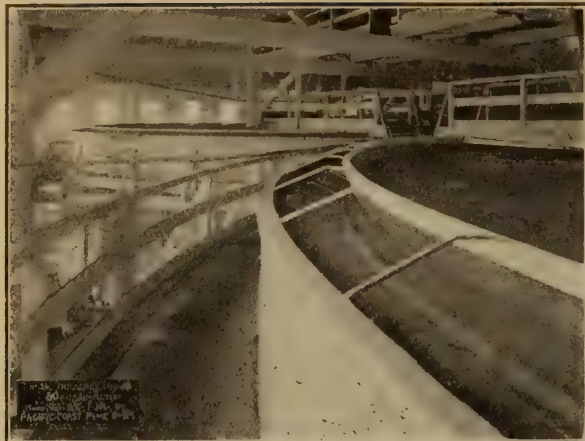
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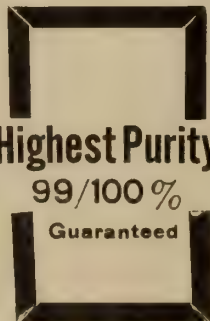
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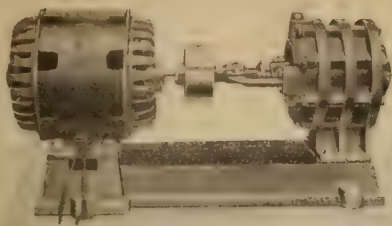
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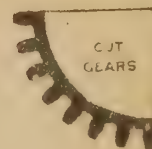
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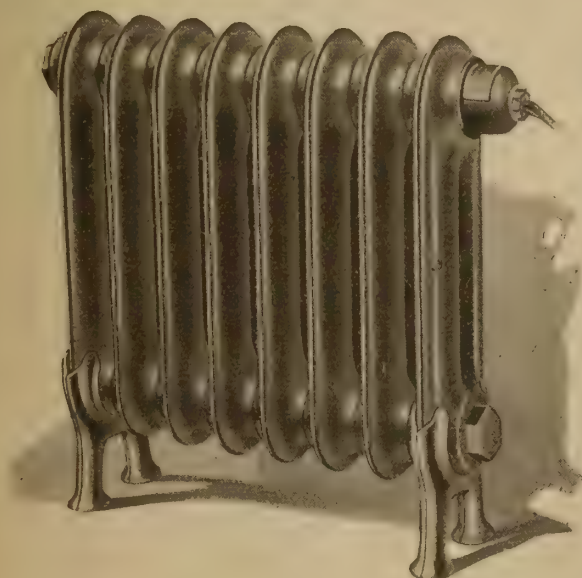
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES unanimously adjudged our basic patent for air-froth-flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision.

On May 4, 1917, in the UNITED STATES DISTRICT COURT OF MONTANA, the opinion of Judge Bourquin was filed in the case of Minerals Separation Ltd., and others against Butte & Superior Mining Company, and was followed by a decree on September 17, 1917, wherein it was adjudicated that the three claims which had been limited by disclaimer were valid and infringed, and that the seven claims adjudged to be valid by the Supreme Court of the United States were infringed. The acts thereby adjudged to be infringement included the use of mixtures of petroleum oils and mineral-froth-forming oils in a total amount exceeding one per cent. on the ore, and also the use of Callow pneumatic cells.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

On November 11, 1918, the SUPREME COURT OF THE UNITED STATES granted the petition of Minerals Separation, Ltd., and others for a Writ of Certiorari to review the decree of the United States Circuit Court of Appeals at San Francisco which had reversed so much of the decree of Judge Bourquin in the suit against Butte & Superior Mining Company as adjudged to be infringements those acts which employed oil of any kind or character used in excess of one-half of one per cent. on the ore.

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Head Office:
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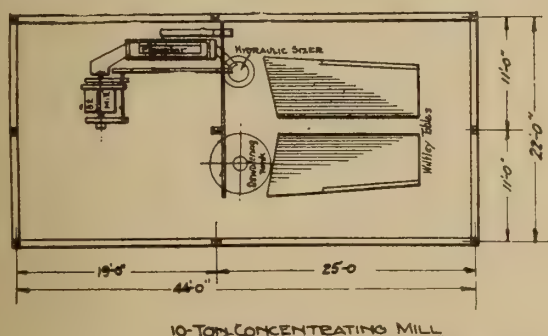
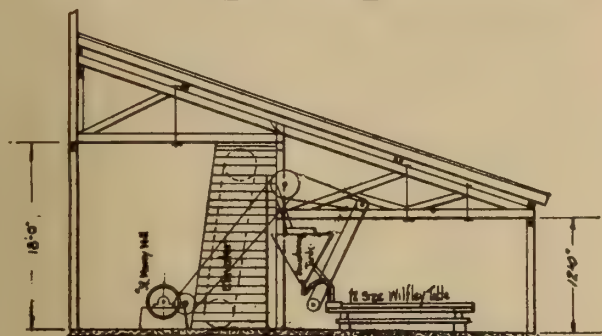
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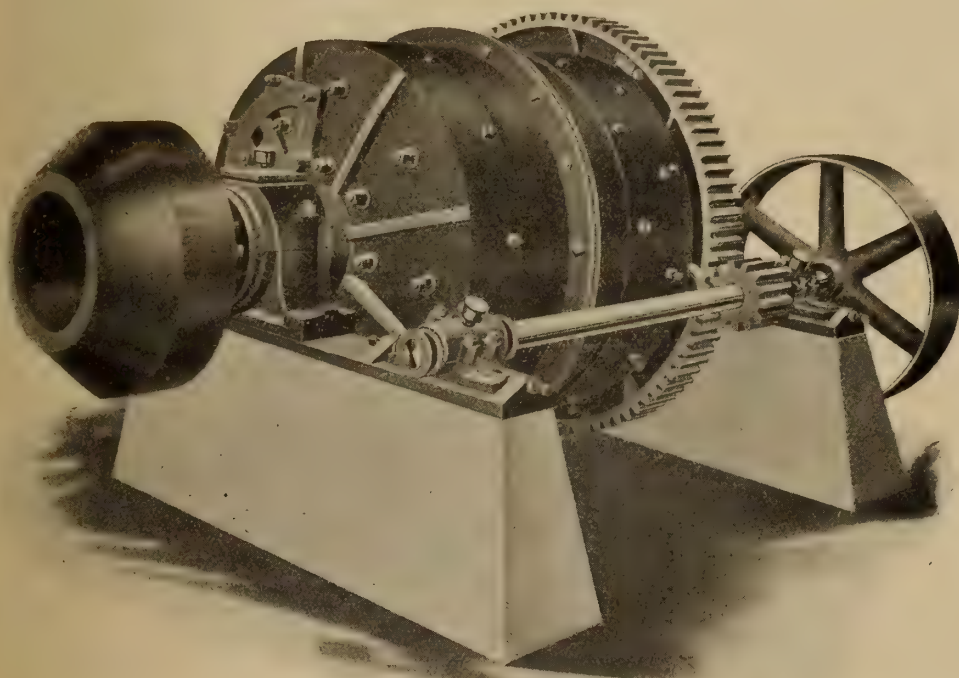
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, December 15th, 1918.

No. 24

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the
MINES PUBLISHING CO., LIMITED

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"Entered as second-class matter, April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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The Federal Trade Commission, United States, has issued formal complaint against Minerals Separation, Ltd., Minerals Separation American Syndicate, Ltd., Minerals Separation American (1913), Ltd., all of London; Beer, Sondheimer & Co., Frankfort-on-Main, Germany; Beer, Sondheimer & Co., Inc., and Minerals Separation North American Corporation, New York City; and Benno Elkan, Otto Frohnknecht and Harry Falek, of New York City. These concerns and individuals are cited to appear before the Commission on December 30th, 1918. They are charged with enforcing agreements "with the intent, purpose and effect of stifling and suppressing competition."

If the Federal Trade Commission will push this investigation until the whole situation is clarified, they will deserve the thanks of the mining and metallurgical industry of not only the United States but also of Canada and, in fact, of all mining countries.

THE CANADIAN MINING INSTITUTE

Should the character of the Canadian Mining Institute be changed? Some of the members seem to be of the opinion that it should be merely an engineering or scientific society rather than an Institute which will continue to draw members from all who are prominently interested in the direction of mining and metallurgical enterprises in Canada. We believe that the Institute can be of most service to the industry as at present constituted.

Some time ago numerous false statements concerning the character of the Canadian Mining Institute were given wide circulation by a poorly informed committee of another society. Some gentlemen having misinformed them, the executive of that society published a very misleading report and asked the members to give the matter as much publicity as possible through the newspapers. In this way the statement was spread abroad that the Canadian Mining Institute was merely a "trade organization" and that the number of scientifically trained men among its members was only about 20 per cent.

To these false statements the Canadian Mining Journal took exception and called attention to them editorially. The Council of the Canadian Mining Institute also took up the matter and demanded a retraction. After many months a half-hearted retraction was made.

Since then, a strange phenomenon has occurred. It having been proven that the Canadian Mining Institute is largely made up of scientifically trained men, some of the members seem to have concluded that the Institute would therefore be of greater usefulness if it excluded all mining men of other classes. This absurd deduction has led to some expressions that imply that the only people of importance in the mining industry of this country are the scientifically trained men. The falsity of this idea scarcely needs mention. Scientifically trained men should be the first to recognize that it takes a variety of men to carry on an industry and that the welfare of that industry cannot be properly assigned to any one class. It is complimentary to the scientifically trained men that they make up four-fifths of the membership of the Canadian Mining Institute. That fact shows that they are taking the lion's share of the work which the founders of the Institute initiated. But it should be recognized that scientists have only the right to demand recognition in proportion to the service which they give. They alone do not develop our mineral resources. It is pleasing to record that they are taking a very large part.

PROGRESS IN MINING IN CANADA IN 1918.

This number, the last of the Canadian Mining Journal for the year 1918, is devoted to a review of progress in the mining districts of the Dominion. In this number will be found special articles on mining in Nova Scotia, Quebec, Ontario, Manitoba, Alberta and British Columbia.

Of unusual interest is the recent progress in Manitoba, a province which has only recently become an important producer of metalliferous ores. There can be little doubt that exploration and development of Northern Manitoba's mineral resources will result in material additions to the wealth of the country.

In Nova Scotia, scarcity of miners has resulted in decreased output of coal. In Alberta, a larger market has resulted in great increase in output, so that, for the first time, Alberta produced more coal than Nova Scotia.

The Quebec asbestos industry is flourishing, while the mining of copper-bearing pyrites for their copper and sulphur contents continues actively.

The Ontario nickel, copper, gold and silver production was very large during the year in spite of many adverse circumstances. The record of the gold mines is a remarkable one and may be taken as an indication of the great future of this industry.

British Columbia made a large output of metals and coal. The search for minerals for war purposes drew attention to the resources of this great province and the activity in 1918 will doubtless have permanently good results.

CORRESPONDENCE

THE MINING ACT.

To the Editor of the Canadian Mining Journal:

Sir,—In your issue for November 15th I note the proposed amendments to the Mining Act, as well as a letter from the secretary of Port Arthur Board of Trade.

Probably you, Mr. Editor, or some of the readers of your journal, can inform me of what use any additions or changes to the Mining Act are, so long as sections 85 and 86 remain in force.

Laws of all kinds may be good or bad; but whether they are good or bad is immaterial so long as power is given to one or two officials to say whether the laws are to be complied with or not.

Mr. T. E. Godson claims that, in his opinion, the Ontario Mining Act is the best in the Dominion, is more elastic than those of other provinces.

As for being elastic, that is the root of the evil, for a prospector never knows whether he is in secure possession of his claims or not. Some sharp mining broker may get wise to the fact that some fool of a prospector has made an important discovery and staked and recorded a claim, covering ground that in the dim, forgotten past was owned by himself. Forthwith a lawyer is engaged and a relief against forfeiture applied for, resulting eventually in the lawyer pocketing

a nice fee, the broker feeling elated over his new mining property, and the commissioner feeling satisfied with a day's work well done. But what is the feeling of the prospector? Sad to relate, he feels that legally or illegally he has received a dirty deal. He wonders why the records did not show that the ground was not open for staking, and why the recorder accepted his application for a record, and why, if it was open, he was not allowed to remain in possession. He goes back into the bush to keep company with the wild animals, knowing that the biggest and most vicious brute may be his fellow man; that under the guise of law someone has robbed him of his well-earned reward for honest labor. Of course, he knows that he could appeal, but he has not the money required to do so.

Were anything pertaining to extensions or relief required to be granted and on the records before the expiration of the life of the claim, very little harm might be done. But to allow a claim to become open for staking, and, being staked, to take it from the lawful holder and give it to one who lost it because he did not comply with the law, is, even if lawful, nothing short of robbery.

This ability to get a relief against forfeiture has developed a practice of which I will give a rough outline. Mr. A, who, by the way, is not in the habit of doing work in the bush, approaches Mr. B and offers him a stated sum (away below the amount he knows it would cost) to get the work required to be done during the year by law, stating that he does not care how it is done so long as it is on record. B takes the money and may or may not do any of the work, but files a report of work.

D comes along and finds no evidence of any work having been done. He stakes the claim and files a dispute which in due course comes up before the commissioner. The burden of proof rests on D. Suppose he is able to prove that no work was done. A pleads that he paid B for doing the work and that B is the only and original rascal, and he asks for time in which to do his work. This is usually granted, and he retains possession of the claim.

What does D get? He has to pay his own costs and about the only thing he is likely to receive is a lecture delivered with the purpose of discouraging claim jumping. Any evidence that B might give would never be considered. Accordingly, A, the instigator of the crime, goes clear. In fact, it is usually made to appear that he is a very much abused man. Consequently, no one cares to dispute a report of work filed, even knowing that the work was never done.

Subsection 3, section 85, was first passed as an Order-in-Council and seems to have been created with a view to providing work for the commissioner and the inevitable lawyers. I have no quarrel with the principle of this sub-section, but it lacks in completeness. It does not require, for instance, that the enlisted man report to the recorder of the district in which his claims are located. As a result, the recorder will accept applications for claims that are owned by soldiers and when these soldiers come back the trouble begins. It is, therefore, easily seen that the lack of attention to detail has beclouded the title to all mining locations made since the 4th day of August, 1914.

This, Mr. Editor, is one of the results of the "elastic" nature of the Mining Act.

Yours, etc.,

L. HEDLUND.

Gowganda, Dec. 2nd, 1918.

Mining in the Province of Quebec in 1918.

By Theo. C. Denis.

As regards mining, the Province of Quebec is rather different from the other provinces, inasmuch that, unlike Ontario and British Columbia, its production in metalliferous ores is small and it differs from Nova Scotia and Alberta in possessing no coal mines. The backbone of Quebec mineral production are non-metallic substances—asbestos, mica, magnesite, pyrites for sulphuric acid, and a very varied assortment of structural materials. The prominent part which the latter plays in the mineral production of the province is indicated by the fact that in pre-war times (in 1913) in a total value of a little over \$13,000,000 the building materials accounted for 62 per cent., the metallic substance for 3½ per cent., only, the balance (34½ per cent.) being made up of non-metallic minerals, such as asbestos, mica, graphite, magnesite. The effect of the war on our mining industry has been most marked, for in 1917 and 1918 the above proportions were greatly altered, and they now stand about as follows: Building materials, 33 per cent.; metallic ores, 12 per cent.; non-metallic minerals, 55 per cent.; the total production of all of which amounted to \$16,266,000 in 1917.

Figures for 1918 are not yet available, but it is likely that the total value will exceed 17 million dollars.

Asbestos Industry is Flourishing.

The asbestor industry has been very active during the year, the demand having exceeded the production. At present there are practically no stocks of asbestos on hand. The production has been strongly stimulated by the war needs, and fortunately the cessation of hostilities is not likely to have any marked effect on the industry, as the ship construction programmes of various countries call for a large consumption of asbestos for a long time to come.

Demand for Chromite Falls Off.

The same cannot be said of chrome mining, which for three years past has enjoyed an unprecedented activity in the Coleraine district, and also at St. Cyr, near Danville. Since the signing of the armistice, the demand for chromite has noticeably fallen off. However, several producers have contracts to fill for some time to come at satisfactory prices, and the decrease in activity will be gradual. It is even possible that the more favorably situated deposits may continue to produce, and compete, on the American market, with New Caledonia, Rhodesian and Cuban ores. The figures of production for 1918 will probably fall below the previous year's, and 1917 will remain a banner year in the Canadian chrome industry for some years.

Magnesite Industry Permanently Established.

Magnesite mining has been very active. Two of the companies are now producing a dead-burned magnesite which finds a very ready market. Cement kilns, burning powdered coal, are used for the purpose and the results are very satisfactory. There is little doubt that this industry is permanently established.

Shortage of Labor Keeps Down Production of Pyrite and Copper.

The pyrite and copper ore production has been greatly handicapped by the shortage of miners. Labor, and especially efficient labor, has been very scarce throughout the year. On this account, and also owing to difficulties in getting railroad cars, the tonnage will probably show a decrease as compared with 1917.

A Successful Year for Quyon Molybdenite Industry.

Throughout the whole of 1917, the price of molybdenite was set by the Government at \$1.09 a pound, and exports to countries other than England were prohibited on account of the war needs of Great Britain. The price in the United States increased up to \$2.50. In January, 1918, the restrictions on the export of molybdenite were removed and for some time the producers enjoyed the wider market at better prices. The supply, however, seems to have more than met the demand, for during the latter part of the year the price in the United States fell to \$1.00 a pound. The Quyon mine had a very successful year and the method of concentration adopted is giving very good results. It is claimed that extraction is about 90 per cent., in concentrates containing 80 to 90 per cent. molybdenite.

Steady Production of Zinc by Zinc Co., Ltd.

Zinc and lead ore mining progressed during 1918. The mines of "Zinc Company, Limited," in Portneuf country, produced all year without interruption, and active development was carried on by the "Federal Zinc and Lead Company, Limited," on their properties at the head-waters of Cascapedia River in Gaspé. These deposits appear to be very promising. At present, they are handicapped by the lack of means of transportation.

Labor Situation Improving.

Since the middle of November the labor situation has been eased off considerably. There is no longer the great dearth of men which prevailed throughout the first ten months of the year. The mine operators have not reduced wages, but they can now to some extent choose the men and dispense with the incompetent, which they could not afford to do before. The labor employed is now much more efficient and willing than a month ago.

Production of Building Materials Should Be Large in 1919.

The cessation of war material manufacture will be felt on next year's production, when a decrease is to be expected. But, on the other hand, the decrease of activity in mining of war minerals will to some extent be compensated by a resumption of production of building materials, which industry has laid comparatively dormant for the last four years.

DOMELAKE.

Mr. Charles A. Randall has been appointed manager of the Dome Lake mine to succeed Mr. A. H. Brown who has resigned. A full force of men has been engaged at the property and a comprehensive plan of development has been mapped out. A winze is being sunk from the 500-foot level to a depth of 600-feet. Three shifts are working.

NEW MANAGER FOR DOMINION REDUCTION.

Mr. S. W. Cohen has been appointed general manager of the Dominion Reduction company at Cobalt, to succeed Mr. E. M. Steindler who died in New York recently. Mr. Cohen visited the property in Cobalt early in the month, accompanied by Mr. D. M. Steindler, president of the Dominion Reduction. Mr. Cohen was at one time general manager of the Crown Reserve and Porcupine Crown Mines, and is well known in Northern Ontario.

Northern Ontario Gold Mines in 1918 Produced about \$9,168,000, Despite Handicaps.

By J. A. McRae.

Despite the great economic strain caused by the world war, the gold mines of Northern Ontario during 1918 have been able to increase their output over that of 1917. While it is yet too early to know what the exact amount will be, it is nevertheless certain that a production of at least \$9,168,000 will be recorded. This compares with a total of \$8,698,831 during the year 1917, an increase of more than half a million dollars. Such an achievement, with over half the gold mines closed down, is considered extremely important, so much so, that interest in gold properties, both prospective and proven, has been recently growing rapidly.

Hollinger Increases Output.

The progress being made, and the results recorded at the Hollinger Consolidated has exceeded the best expectations of the most sanguine, and by producing approximately \$520,000 monthly, or something like \$6,250,000 during the current year, has eclipsed all its former records. Since 1911, this great gold mine has repeatedly been the cause of startling achievements. However, an increase of over \$2,000,000 in output during 1918 over that of 1917, or more than \$1,000,000 above the previous best year in the company's history, was more than the most optimistic had dared to hope. Since beginning production in 1911 the property of the Hollinger has yielded a total of close to \$26,000,000, out of which \$9,178,000 has been returned to shareholders in the form of dividends, and, in addition to which the greatest mill for the treatment of gold ore on the continent has been erected. Also, a large cash surplus has been accumulated, upwards of \$2,000,000 being invested in Dominion Government bonds. At the beginning of 1918 the official estimate of ore reserves showed a little over \$40,000,000. The following is a summary of the output from the Hollinger, beginning in 1911:

Year	Values Recovered.	Dividends Paid.
1911	\$ 46,082.52	.....
1912	933,682.00	\$ 270,000.00
1913	2,488,022.58	1,170,000.00
1914	2,719,354.47	1,170,000.00
1915	4,205,901.69	1,720,000.00
1916	5,073,401.05	3,126,000.00
1917	4,261,938.72	738,000.00
1918	6,250,000.00	984,000.00
Totals	\$25,978,383.03	\$9,178,000.00

It could perhaps be pointed out that the estimate of output for 1918 is based upon official figures which show a production of upwards of \$520,000 monthly during the first nine months of the current year. The \$984,000 in dividends paid during 1918 does not represent one-half of the net earnings, in that at the beginning of this year the net surplus was less than one-quarter of a million, whereas it is now apparently upwards of two million dollars.

McIntyre-Porcupine.

The McIntyre-Porcupine also continues to develop in a big way. The main works are now being carried to a depth of 1,375 feet, the deepest workings in the camp.

Production at the McIntyre is being maintained at about \$140,000 per month. With additional labor this output could be materially increased. The ore in reserve at the McIntyre ranges between \$4,000,000 and \$5,000,000.

Milling Facilities and Present Production.

Perhaps the clearest and most concise description of the present position of the various gold mines could be given as follows, showing the mining facilities at each mine and showing whether or not the mills are in operation, and at what capacity:

The Porcupine Gold Mines.

Mine.	Daily Capacity, in Tons.	Present Rate.
Hollinger Consolidated	2,800	Half
Dome Mines, Limited	1,350	Closed
McIntyre-Porcupine	600	Full
Schumacher Mine	200	Closed
Porcupine-Crown	140	Closed
Porcupine V.N.T.	120	Closed
Dome Lake	100	Three-quarters.
Davidson Gold Mines	70	Full
Total	5,355	

Kirkland Lake Gold Camp.

Mine.	Daily Capacity, in Tons.	Present Rate.
Kirkland Lake Gold Mines, Ltd.	150	New
Tough-Oakes Gold Mines ..	140	Closed
Teck-Hughes Gold Mines ..	80	Closed
Lake Shore Gold Mines ...	70	Full
Total	440	

Boston Creek Gold Camp.

Mine.	Daily Capacity, in Tons.	Present Rate.
Miller Independence	40	Half
Patricia Syndicate	40	Closed
Total	80	

Munro Gold Camp.

Mine.	Daily Capacity, in Tons.	Present Rate.
Croesus Gold Mines	50	Closed
Hill Gold Mines	40	Closed
Total	90	

This gives the following grand total:

Porcupine	5,355 tons
Kirkland Lake	440 tons
Munro Township	90 tons
Boston Creek	80 tons
Grand total	5,965 tons

In the aggregate, just a little over one-third of the available milling equipment is being used at the

Northern Ontario gold mines as a result of the shortage of labor and high cost of supplies. Now that the peace conference between the Allies and their enemies will probably clear up any possibility of resumption of wars, and with an increasing demand for gold, it seems reasonable to expect the great majority of these mills will be worked to their fullest capacity some time during the coming year. All this points toward great prosperity at the gold mines during 1919 and the succeeding years.

Kirkland Lake Area is Being Successfully Developed.

In addition to the large way in which the Porcupine mines have developed, is the fact that success in the new Kirkland Lake field is second only to Porcupine. Two modern mills have been completed in this district during 1918, namely, at the Lake Shore Mines, and at the Kirkland Lake Gold Mines. The latter has just been completed and is being tried out this month, while that of the Lake Shore has been completed and in full operation since March 8th, last. Since that date, production has ranged from \$40,000 to \$45,000 monthly, and the average grade of ore treated has been around \$24 and \$25 to the ton. The company has disbursed two dividends, each amounting to $2\frac{1}{2}$ per cent. or \$50,000, or a total of 5 per cent., amounting to \$100,000. A mill with a capacity for 150 tons daily is proposed and will probably be constructed at the Wright-Hargreaves mine during the year 1919.

Rich Gold Tellurides at Boston Creek.

In the Boston Creek gold area the sensational development at the Miller-Independence Mines, where gold tellurides have been found to occur profusely in a large vein, has been one of the most interesting and important developments in years. This field constitutes the third best gold mining area in the province, as so far developed. Plans are being laid for aggressive development work at the Independence, and, from the manner in which the rich orebody is developing at the present time, there are reasons for anticipating exceedingly favorable results. Provided the company is able to announce having completed plans for operations on an extensive scale, not a few leading mining men who have had experience in fields where tellurides occur are of the opinion that extensive developments in this area will become general, and that the potentialities of such a deposit of gold tellurides are of the highest importance, so much so that it becomes very difficult to estimate. During the year a mill was constructed on the Patricia property, but owing to the shortage of labor has not been consistently operated. Before long, however, it is expected plans will be made for pressing it into service.

Outlying Fields Await Development.

In the outlying fields not much work was done during 1918. In the Lightning River district a shaft was driven to a depth of about 70 feet on a promising vein, but the costs of supplies when delivered at the property proved prohibitive, and work was suspended in November. Also, in the Fort Matachewan gold area a good deal of activity was shown early in the year. However, with the exception of the Otisse property, nothing extensive has been done. On the Otisse, thirteen diamond drill holes were driven and it has been stated officially that a large tonnage of ore has been

indicated. At the present time, plans are being considered with a view toward installing a mining plant and carrying on work in a large way. In the meantime a company known as the Matachewan Gold Mines Company, has been formed with a capitalization of 4,000,000 shares with a par value of \$1 each, for the purpose of developing the property.

Great Activity in Gold Mining in 1919.

The coming winter is expected to bring a favorable adjustment of working forces. The coming summer is expected to witness practically all the gold mines in full operation. Also, the coming summer is expected to be the most active summer in the prospecting field since the summer of 1914. The outlook, in every way, never appeared so bright for those who have pinned their faith and their fortunes toward the exploring and development of the great gold zone of Northern Ontario, which is already of world importance, and which bids fair to soon assume a leading place among the greatest of gold-producing areas.

DOMES MINES.

With the death of Captain J. R. DeLamar, of the Dome Mines, in New York this week, much speculation is rife regarding the effect his passing will have upon future operations of the big mine, which is conceded to be the second largest gold mine in the Dominion of Canada. It is understood the late president of the company left his affairs in such shape that no unusual disturbance of the affairs of the company is anticipated. The Dome mines will be the centre of increasing interest during the next few months, during which time the property is expected to reach a stage of capacity production once again. It is probable that these next few months will call for exceptional executive ability and able administration, by reason of the fact that it will be necessary to secure the services of a large staff of technically trained men, a task which entails the utmost care if the best interests of the company are to be served. The consensus of opinion appears to be that the first year following the recommencement of milling and mining operations on a large scale will provide many pleasant surprises for those interested in the great mine. Mr. J. S. Bache, of New York City, has been appointed president of the Dome Mines company to succeed Mr. DeLamar, and no doubt the affairs of the company are once again under able administration.

CONIAGAS DROPS OPTION ON ANKERITE.

According to recent word from Porcupine the Coniagas Mining Company has dropped its option on the Ankerite property there. During the currency of the option a large amount of development work was done on the property, and the prevailing impression had been that results being met with were of a very satisfactory nature. However, the option, on which a large cash payment is said to have accrued due the first of the current month, has been allowed to expire. In the meantime the Coniagas has moved its supplies and equipment to the adjoining Maidens-McDonald property which it owns and on which development work is to be conducted.

Cobalt Silver Mines in 1918 Produced 18,000,000 Ounces Silver, Valued at \$17,000,000.

By J. A. McRae.

One and a half decades have passed since silver was first discovered in Cobalt. As the year 1918, the fifteenth year of its productivity, draws to a close, it is evident the production for the year will be equal in value if, indeed, not in excess of any previous year.

Production for the year, it is now evident, has averaged about 1,500,000 ounces per month, and by the end of the current month will have reached an aggregate of approximately 18,000,000 ounces for the calendar year. The value of the output will be over \$17,000,000. Provided no change occurs within the next sixteen days in the quotations for commercial bar silver, the average for the full twelve months will be 96.69 cents per ounce. This compares with an average of 81.41 cents per ounce during 1917, and represents an increase of slightly over 15 cents per ounce. This 15-cent increase on a production of 18,000,000 ounces adds approximately \$2,700,000 to the year's production. It is now quite interesting to look back to the opening year of the war against Germany, when the price of silver fell below 50 cents an ounce, and at one time hovered around 48 cents an ounce, thus constituting approximately one-half the 1918 average. It is needless to emphasize what this doubling in price has meant to the Cobalt mines.

A Year of Steady and Successful Operation.

The year has not been marked by any particularly notable development, but has been one of consistent operation, marked by few particularly sensational successes and likewise only a few disappointments. The Nipissing, Mining Corporation of Canada and the Kerr Lake have been the leading producers, the two former companies producing somewhere around four million ounces each, and the Kerr Lake around two and a half million ounces. Other companies producing over one million ounces each are the O'Brien and the Coniagas. The Nipissing, with its large acreage of unexplored ground, has added a number of high-grade silver veins to the large number previously known. A more or less comprehensive plan of development is now taking place in addition to continuing normal production. This may reasonably be expected to bring in additional, and perhaps important, veins. Everything considered, there is reason to believe the Nipissing from now forward for several years will be able to lay claim to the distinction of being the largest silver-producing mine under the British flag.

Changes in Personnel of Companies.

Development work below the diabase sill at the Beaver Consolidated which, early in the year gave promise of adding greatly to the value of the mine as well as adding to the potential value of adjacent properties, does not appear to have been attended with the success at first indicated. The beginning of December found work suspended in the zone below the diabase sill. However, the lower workings were being kept pumped out and it is evident further work in that zone is contemplated. Early in the year Frank L. Culver, in control of the Beaver, and also formerly in control of the Temiskaming Mine, lost control of the latter, being succeeded to the presidency of the Temiskaming company by J. P. Bickell. Other changes in the personnel of the various companies included the appointment of T. R. Finnucane, former manager of the McKinley-

Darragh-Savage Mines, to the position of managing-director, and the promotion of J. C. McCloskey to the managership. Douglas A. Mutch resigned as manager of the Hudson Bay Mines, to take over the management of the Ankerite mine of the Coniagas Company. A. H. Brown, a former manager of the Hudson Bay, again entered the service of the company. J. W. Moffet, owing to illness, resigned from the Beaver, and L. W. Ledyard, a former manager of the Teck-Hughes mine, was appointed general superintendent of the Beaver. With the change of control at the Temiskaming mine I. S. McReavy was appointed manager. A number of other less important changes took place.

Prospecting on Non-Producing Properties.

A good deal of prospecting work has been done at a number of non-producing mines. Among these, the Adanac Silver Mines has made perhaps the largest and most consistent effort. During the year approximately one thousand feet of work has been done. A number of large veins were opened up. At the time of writing, very encouraging silver values are being encountered.

At the Ophir, a good deal of work has been done, but with not altogether favorable results. At the Gifford, considerable exploratory work has been carried on. The Cochrane property, adjoining the Temiskaming mine, was taken under option by the latter company a few months ago and is being explored through the workings of the Temiskaming. The mill of the Temiskaming was closed down last spring owing to ore reserves being low, and was re-opened a few weeks ago. The Foster property was leased in the early fall to C. L. Campbell and W. Fairburn. A shoot of high-grade ore was encountered which has yielded almost one carload of ore. The Trethewey company purchased the property of the Castle Syndicate, in the Gowganda district and is conducting development work with fair encouragement.

At the Peterson Lake an oil flotation plant was installed and has been working with good results for the past two months or more.

In the township of Bucke, some interest has been manifested during the current year. The former Green-Meehan Mine, now controlled and operated by Edwards & Wright, has yielded a large tonnage of low-grade ore together with an encouraging amount of high-grade. The Mining Corporation of Canada purchased a property in the late summer near North Cobalt, and has installed an electrically driven mining plant, and propose sinking a shaft to a depth of 300 feet. This work is being watched with a good deal of interest, in that any success here might reasonably lend value to a large area where rock formations are of a similar character as that upon which the Mining Corporation is conducting exploration work.

In South Lorrain.

In the South Lorrain area the Pittsburg-Lorrain Syndicate, having a lease on the Wettlaufer Mine and mill, as well as operating its own property, carried on work throughout the year, but, at the time of writing, has planned to close the mill during the winter. The Keeley mine is being worked in a small way, a carload of ore being sent out about the middle of November.

Cobalt Payroll, \$3,500,000; Power and Supplies, \$3,500,000.

Employing approximately 2,375 men, the payroll of the Cobalt mining companies has approximated nearly \$10,000 per day or about \$3,500,000 for the year. At least an equal amount, perhaps, has been paid out for

power and supplies. This appears to indicate a profit of upwards of \$9,000,000 for the year 1918, probably the greatest net profit ever realized in any previous year in the history of the camp.

There were times during the year when a number of the mines conducted operations with a deficiency of perhaps ten per cent. in the number of men normally required to operate to best advantage. Also there were times when more or less difficulty was experienced in securing the requisite supplies without expensive delays. These factors combined to reduce the efficiency which otherwise might have attained a higher plane. However, now that peace is in sight, and now that men are returning from the munition plants and seeking employment at the mines, the deficiency in numbers and efficiency may reasonably be expected to rapidly become adjusted.

Cobalt Has Produced 292,724,172 Ounces Silver Worth \$169,360,561.

The output of silver from the Cobalt mines has now reached the enormous aggregate of approximately 292,724,172 fine ounces with a value of about \$169,360,561. Before the middle of 1919 the output will pass the three hundred million ounce mark.

The following is Cobalt's record:

	Average price, cts. per oz.	Ounces.	Value.
1904	57.2	206,875	\$ 111,887
1905	60.4	2,451,356	1,360,503
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.9	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553,981
1914	54.8	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.661	19,915,090	12,643,175
1917	81.417	19,401,893	16,131,013
1918	96.69	18,000,000	17,409,998

Totals 292,724,172 \$169,370,559

At the present rate of production, and with silver maintaining at its present price, it would require less than five more years to bring Cobalt's total to close to four hundred million ounces and with a total value of upwards of one-quarter of a billion dollars.

A Promising Future for the Cobalt Silver Mining Industry.

As for the future, with metal authorities predicting a continued high price of silver for several years, Cobalt's prosperity is expected to increase during the post-war era. The reasons are several. Chief among them is the fact that abundant labor will be available, and that the cost of supplies will decline. Indeed, there is already evidence of the commencement of this expected decline in costs. In recording the foregoing statement, that Cobalt's prosperity is expected to increase during the post-war era, it should perhaps be well to point out that such is not meant to convey the belief that the output of silver will increase. Quite to the contrary, there may reasonably be expected a slight decrease in output from year to year, but so slight, especially with silver at the present high quotation, as to convey no threat to the profitable existence of the mines for a great many years. A few of the mines will gradually reach the end of their resources, while others

may reasonably be expected to bring in new and hitherto unknown deposits, this to continue for many years. The increase in efficiency and the lower costs, for a considerable time should serve to offset any slight decline in output, and thus maintain profits, in the aggregate, at about the present level.

Casey-Cobalt.

A car-load of ore was shipped a few days ago from the Casey-Cobalt Mine situated in the township of Casey, about nine miles north-east from New Liskeard. The ore was shipped to Denver, Colorado.

Mr. Bruce White, one of the best known mining men in the Kootenay District the man who staked the Slocan Star, died at Nelson, B.C., recently.

R. K. Neill, the proprietor of the Bush Mines, Portland Canal District, B.C., is preparing for extensive development work. He is arranging for the purchase of horses and outfit to haul ore from the mines to the wharf. Meanwhile, everything possible is being done to complete road building.

IRON ORE ON BELCHER ISLANDS.

Iron ore of good grade is reported to have been found on Belcher Islands. Mr. Robt. Flaherty reported that the deposits examined by him were low-grade—38%. More recent discoveries, of which we show photographs, are said to be of higher grade. The ore is blocky hematite resembling that of Newfoundland. The photographs are furnished by Mr. Sainsbury, one of the discoverers. Mr. M. M. Gibson, of Toronto, has reported favorably on the property.



Iron Ore on Belcher Islands, Hudson Bay.

Coal Mining in the Province of Alberta in 1918.

Production Increased 20 Per Cent.

By John T. Stirling.

It is estimated that the production of coal in Alberta for the year 1918 will be slightly in excess of six million tons, and as the production for the year 1917 was 4,863,414 tons this means that there will be an increase during 1918, over 1917, of approximately 20 per cent. Exact figures are only available for the nine months ending September 30th, 1918, and these figures show that there were produced during that period 4,594,200 tons as compared with 3,182,826 tons during the same period in 1917.

Increased Quantity of Alberta Coal Sold in Canada.

It is gratifying to note that the market for Alberta coal has been extended to such an extent that 384,622 tons of domestic coal were shipped into the province of Manitoba during the first nine months of the present year as compared with 153,243 tons during the same period of 1917. The reason for this large increase is, of course, due to a great extent to the statement made several months ago, by the Fuel Controller of Canada, that shipment of anthracite coal from the United States to Canada would be very considerably decreased during 1918 and also to the fact that an extensive publicity campaign was started by the Provincial Government of Alberta warning consumers to put in their supply of fuel at the earliest opportunity. As a result of this campaign a great deal of fuel has been stocked throughout the western provinces, ready for use during the winter months, to such an extent that no shortage of fuel need now be anticipated in the provinces of Alberta, Saskatchewan and Manitoba, even although a severe winter is experienced.

Several new mines have been opened during the year and several abandoned, making the total number now in operation 263. There are employed at the present time 2,782 men above ground and 6,195 men underground.

Now that a great deal of the prejudice that has existed in Manitoba and Saskatchewan has been overcome it is to be expected that the market, which has been obtained in these provinces during the last few months for Alberta coal, will continue to increase.

There Is No Necessity of Importing Coal Into Prairie Provinces.

There appears to be no reason whatever why any coal should be imported from the United States into these provinces, unless in a few isolated cases where it would appear that small amounts of anthracite coal were essential.

Alberta Could Produce 9 or 10 Million Tons Coal Annually Now.

Although the output produced in Alberta has increased so considerably during the past few years, I am of the opinion that if the mines were worked steadily during the whole year without increasing the present labor employed and with the present amount of development work done that between nine and ten million tons of coal could be produced annually. This is a safe estimate, as during four or five months of each year 80 per cent. of the mines are idle owing to lack of orders. Even with the wide publicity that has been given the question of fuel during the last twelve months very few of the domestic coal mines in the province have worked to more than 50 per cent. of their capacity

during the months of September, October and November. The same conditions exist in the steam coal mines, although in a lesser degree and a number of the operators of these mines are becoming seriously alarmed regarding the outlook for market during the next few months.

MILLER-INDEPENDENCE.

According to advice received it has been planned to increase the capitalization of the Miller-Independence Mines of Boston Creek from 500,000 to 700,000 shares. This decision was reached by the directors at a meeting held in Dayton, Ohio, the early part of the current month. This has been made advisable owing to the large way in which the company's property is developing. Heretofore it had been planned to operate a 40-ton mill already installed, and in this small way work the rich deposit. Development work during the past few months, however, has entirely outgrown the present equipment. In order to facilitate the desired additions to the plant and mill, which will be increased to several times its present size, as well as improve transportation to the property and make available electric power, it was decided to increase the capitalization by 200,000 shares. The price at which the new stock will be issued has not been announced. In the meantime work at the property is going ahead unremittably.

Mr. Wm. Adams is in charge of surface and milling operations, while Mr. Jack Murphy, formerly of the Tough-Oakes Gold Mines, is superintending underground operations.

As the development of the property proceeds it becomes more apparent that a series of veins occur, the richness and extent of which only future developments will reveal. It has been expected that the number one vein which is dipping sharply to the north, would come in contact with the main vein at a depth of about 120 feet. However, the working has been carried to a depth of 200 feet on the main vein with no sign of the number one vein coming in. Between these two veins another strong fracture occurs, and it is now believed the number one vein joins this fracture and straightens up in conformation with its dip. It is thus thought that the number one vein which is narrow and dipping sharply to the north is but an off-shoot of a large fracture between the two veins being worked. Another interesting and important development is the fact that there is a good deal of the mineralization of the main vein of the Miller-Independence which was hitherto believed to be copper pyrites (chalcopyrite) has been found to be in reality a bronze-colored telluride. The first intimation of this was contained in an article written by W. E. Simpson in September, in which Mr. Simpson says in part: "In mines like the Miller-Independence, the ore, at present, seems rich enough to bear the expense of any method of treatment, no matter how costly. Fine bronze colored tellurides are scattered profusely through the selected pieces (meaning those pieces taken for analysis), giving them a coppery appearance, although no copper may actually be present." This bronze colored telluride occurs in close association with the heavy and extremely rich calaverite. The foregoing announcements prove the most interesting in connection with the development of the Miller-Independence since the early announcements of the striking of telluride gold ores on the property.

MINING OPPORTUNITIES IN NORTHERN MANITOBA

Mineral Areas

Approximately three fifths of the total area of Manitoba is Pre-Cambrian, and all but a small part lies in Northern Manitoba. In the Pre-Cambrian in Ontario, the well-known camps of Sudbury, Cobalt and Porcupine have been developed. In Northern Manitoba there was practically no prospecting until the Hudson Bay Railway gave access to the mineral districts. There are three fields in particular to which attention is now directed—The Pas Mineral Belt, the Cross and Pipestone Lakes area, and the Oxford Lake, Knee Lake, God's Lake and Island Lake area.

Development

Since 1915, development has been rapid in the Pas Mineral Belt. An extensive body of low-grade copper ore has been explored by diamond drilling at Flin-Flon Lake. High grade copper is exported from Schist Lake to the smelter at Trail, B.C.; three and three-quarter million pounds of copper have already been realized. Copper prospects are under development on Athapapuskow Lake, Copper Lake and Brunne Lake. The building of a smelter will give impetus to the development of a large copper industry. Gold is now produced at Wekusko Lake, and important discoveries have been made on Copper Lake, and on Knee Lake on the Hayes River route.

Transportation

Transportation is available by the Hudson Bay Railway, by the Ross Navigation Co. Steamboats on the Saskatchewan River, and by wagon roads built into the producing areas by the Manitoba Government. Wekusko Lake may be reached in less than one day from The Pas. The Hudson Bay Railway gives easy access to several promising districts where little prospecting has yet been done.

Mining Regulations

The mineral resources are under Federal control, and the Dominion Mining Laws apply to Northern Manitoba. No mining license is required. Work to the value of \$100 per year must be performed for a period of five years on claims filed under the quartz mining regulations. The office of the Mining Recorder for Northern Manitoba is at The Pas.

To Prospectors

The mineral areas in Northern Manitoba are virtually unprospected. Valuable discoveries both in copper and in gold have been made within the last few months. The opportunities for prospectors are exceptionally good.

For maps, reports and general information, apply to

**The Commissioner of Northern Manitoba,
The Pas, Manitoba.**

Mining in Northern Manitoba, 1918

By R. C. WALLACE, Commissioner of Northern Manitoba.

In Northern Manitoba there has been steady progress during the year. With the building of a railway and the erection of a smelter—and this should be well advanced before the close of another year—a large copper industry is assured. A detailed and fully illustrated article by J. A. Campbell, M.P., on mining operations and prospecting in this area was published in a recent issue (Nov. 1st) of this journal. It will, therefore, be unnecessary, in a review of the progress for the year, to do more than refer to some of the salient features.

Enormous Tonnage of \$10 Ore at Flin-flon.

On the Flin-flon property, diamond drilling was continued by the Fasken-Black syndicate until the end of June, when the preliminary work of mapping out the orebody was completed. The tenor of the ore is remarkably uniform, the average value being slightly less than \$10 per ton. Horseshoes of unmineralized rock occur throughout the orebody; and these, it is understood, have now been fully defined. Official figures are not to hand as to the total extent of the orebody, as explored by drilling, but the figure of 20,000,000 tons has been commonly quoted in this connection. The obstacle to development was the war situation. This obstacle has, happily, been removed, and development should now be rapid.

Mandy Mines Shipped 6,300 Tons Ore, Averaging Over 20 Per Cent. Copper.

At the Mandy mine, work has proceeded continuously though the labor situation made it difficult to maintain the necessary staff. Six thousand three hundred tons of ore were transported to Trail during the summer. Owing to the abnormally low water in the earlier part of the summer, steamboat navigation was difficult, and ore shipments came in slowly. The open season was, however, unusually prolonged, and transportation was possible till the beginning of November. A contract has been let for winter haulage of 10,000 tons to Sturgeon Landing, to be ready for water transportation next year. The tenor of the ore is slightly higher even than the shipment of 1917.

Other Copper Properties.

Diamond drilling has been continued by a Duluth syndicate on the Chica group, near the mouth of the Pine-root river. Important discoveries have been made in a new district on the northeast arm of Lake Athapapuskow. The ore consists of bornite and chalcopyrite, distributed through a sheared porphyry, and occurring also as stringers in the rock. Development work is proceeding to determine the average surface values. If sufficiently high, large low-grade properties will be opened up in this area. Extensive sulphide orebodies are also being prospected at Copper Lake, some

10 miles northeast of the discoveries on Athapapuskow Lake. In this field a spectacular gold discovery has recently been made by K. J. Peterson.

Rex Mine Begins Gold Production.

The province is now definitely a producer of gold. Up till the end of October, the returns from the Rex mill, at Wekusko Lake, which commenced operations in May, were approximately \$21,550. While the figures are not high, it is remarkable, nevertheless, that under present adverse economic conditions, and in face of a very seriously depleted labor supply, a gold mine somewhat far removed from transportation should be in a position to initiate and continue operations. During the winter a 30-ton Lane mill was installed, two amalgamating plates, two Deister Overstrom concentrators, one 60-h.p. engine, two 60-h.p. boilers and one 320 cu. ft. compressor plant. The returns are from the plates, the concentrates being stored till suitable machinery is installed. The shaft has been sunk 117 feet, the south drift at the 100-ft. level has been run 200 ft. and the north drift 90 feet. At present the ore is stoped from the north drift near the shaft. The vein continues to show an average width of 4½ feet, and the values are remarkably high. The prospects are favorable that this mine will become a large producer.

The Makeever Brothers, who have formed a company to operate the mine, took an option on the Dauphin-Elizabeth group, and sank a shaft to a depth of 50 feet. The option was not taken up, but The Pas Consolidated Mines, Ltd., have now begun operations on this property.

An option was also taken on the Northern Manitoba property, and a shaft has been sunk beyond the 100-ft. level, and some 50 ft. of drifting done at that level. This is a narrow vein, carrying very rich ore, and persisting practically without change as far as prospected. In places values also occur in the quartzite of the hanging wall when heavily mineralized with arsenopyrite and tourmaline.

Gold Quartz in Sheared Porphyry.

It is noteworthy that in at least three widely separated areas gold discoveries have been made which resemble one another fairly closely, and differ from the gold deposits hitherto prospected. They occur as series of stringers or veins of gold-bearing quartz in wide bands of sheared porphyry extending to 75 ft. in width. Two of these areas are in Northern Manitoba. P. Gasse discovered a deposit of this nature in a sheared zone in the granite at the north end of Wekusko Lake. This has been sampled to a width of 75 feet. On the north shore of Knee Lake, on the Hayes River route, a prospecting party under H. M. Paull, made two such discoveries in a sheared porphyry, mineralized with copper sulphides and arsenical pyrites. High values have been obtained on cross-channeling widths of 50 feet on both locations, presumably on the same line of shear. These latter deposits are of interest in that they will attract attention to the Keewatin belt which extends southward to God's Lake and Island Lake.

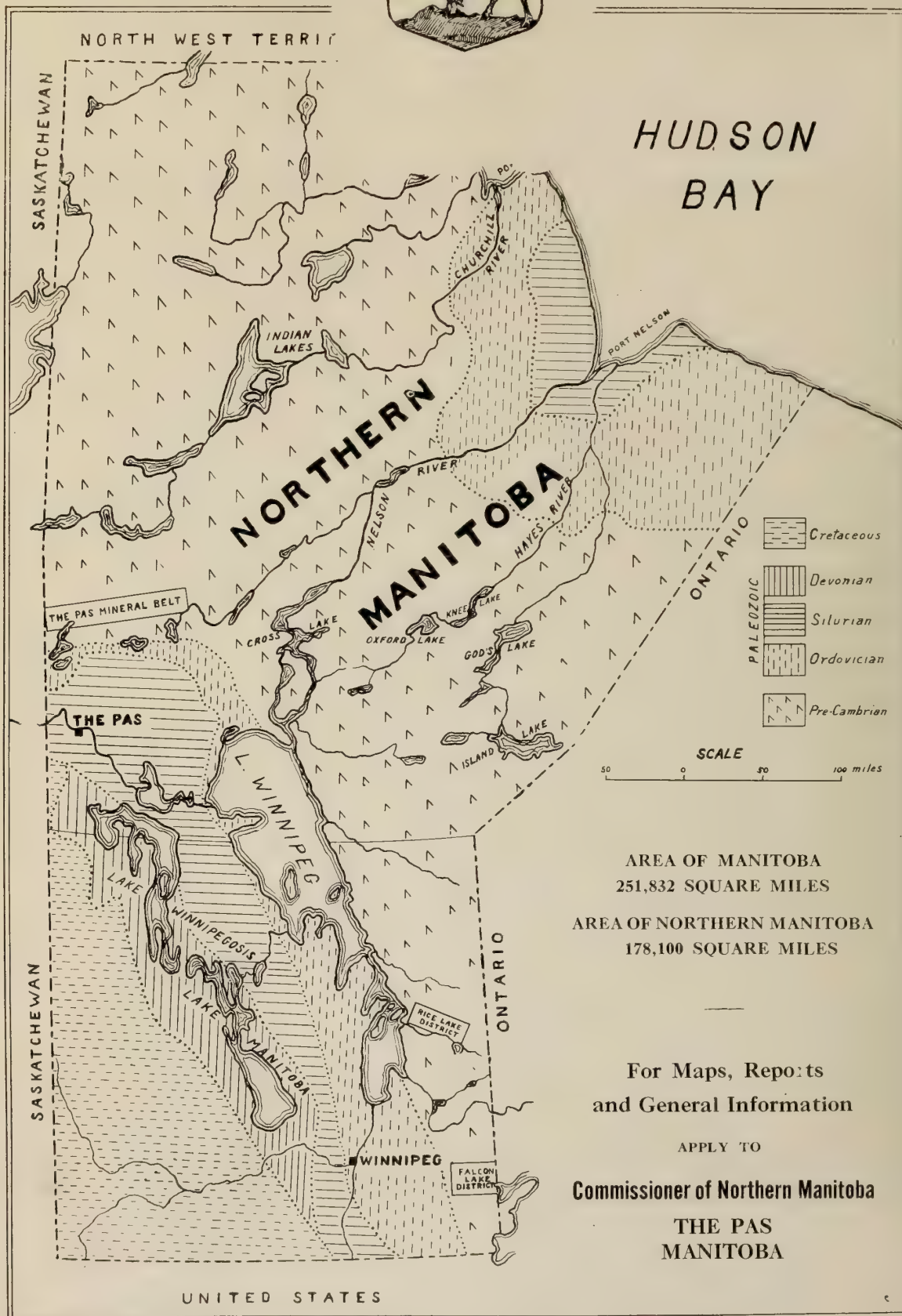
Copper Ore from Northern Manitoba



Copper and Zinc Ore from the Mandy Mine, Schist Lake, The Pas Mineral Area, Northern Manitoba.

The larger piece is chalcopyrite, such as is being mined. The ore shipped averages over 20% copper.

The smaller piece contains chalcopyrite mixed with sphalerite (zinc sulphide). This mixed ore is not being shipped.



GEOLOGICAL SKETCH MAP OF MANITOBA

BRITISH COLUMBIA IN 1918

By Robt. Dunn.

With the approach of the end of the year it is the custom to cast the eye back over the twelve months about to expire, with a view to ascertaining what has been accomplished in comparison with other similar periods. By this means it is possible to determine whether, in the particular industry under review, the country is making progress or otherwise. To no one is vouchsafed the gift of unerring accuracy in prophecy, but it is interesting, by taking the figures available and gauging the general conditions of the moment, to endeavor to arrive at some conclusion as to what the future is likely to hold for the special line of endeavor being discussed.

It is generally admitted that British Columbia is wealthy in its minerals. From the fifties of the last century it has been widely known as a mining province. Ever since the fame of the gold fields of the Cariboo District brought thousands of pioneer prospectors to the then unexplored and little-known Canadian West, British Columbia has been recognized as one of the most important of the mineral sections of the Dominion. Its output has steadily mounted and, though outstripped by the province of Ontario up to the present, there are many who predict that the time is coming when the Pacific Coast province will justify the faith of those identified with the development of its mineral by overcoming the lead now established, and obtaining and maintaining a comfortable margin.

When the war was declared in 1914, and various forms of mineral became an imperative necessity to the allied nations, this province, in common with all other mineralized sections of America, began to experience a stimulation of activity which made its mark on the annual production and, of much greater importance, brought home to local mining men and to outside parties interested in mining, a clearer conception of the mineral resources of the province. This advance in output continued until 1916, when the record of \$42,290,462 in mineral values was established. Then came the drop of 1917 with \$5,280,070 less, the total being \$37,010,392. Different explanations were given of this decline, chief among which were labor troubles, and those who discuss these matters, and whose judgment the general public has been educated to accept, ventured the opinion that, barring similar distressing experiences, it was likely that the 1918 production would come back to that of 1916. Will it? Were the predictions of those referred to sound and are they going to be borne out by the statistics that shortly will come to hand?

These are the questions which are being debated as the year draws to a close. They are subjects of much argument and much speculation.

Copper Production in 1918.

It is not the intention of the writer to venture, even now, on the quicksands of prophesy; but it may be said with reasonable assurance that British Columbia, when the books of 1918 are closed, having been audited and found correct, will be found with a copper production to her credit in excess of that of 1917, but possibly not quite up to the mark of the record year of 1916. This assertion is based on the figures available for the first nine months of the year.

Before going any further, it seems best to explain, as far as possible, the situation with regard to copper

production. In 1916 it totalled 65,379,364 lbs. and in 1917, 59,007,565 lbs. Official returns indicate that the Granby Consolidated Mining & Smelting Co., by far the largest producer of copper in the province, had turned out at the end of the month of September, or during the first nine months of the year, 29,081,635 lb.; the American Smelting & Refining Company at its Tacoma, Wash., smelter had produced from British Columbia ores over the same period, 16,344,376 lb.; and the Ladysmith Smelting Corporation, at its Ladysmith smelter, which now is closed down, had produced 96,212 lb. No advice has been received as to the results of the operations of the Consolidated Mining & Smelting Co. at its Trail Smeltery. The Northport Smelting & Refining Company reports that, at its Northport Smeltery, no British Columbia ores had been treated during the first three-quarters of the year. Therefore, the total output for nine months of 1918, of which there is knowledge, was 45,518,223 lb. Therefore, there must be produced in the last three months of the year 13,489,342 lb. in order to equal the mark of 1917. Simple figuring shows that the Granby smelters have been producing at the rate of 9,693,878 lb. a quarter and the Tacoma smelter at the rate of 4,086,094 a quarter. If they alone continue this pace until the close of the year the additional production will aggregate 13,779,972 lb. and the provincial production will reach at least 59,298,195 lb., or 290,630 lb. in excess of 1917. Working on the basis given the margin resulting is small; but it must be remembered that nothing is said of the Consolidated Mining & Smelting Company's production which, it is to be presumed, will not be inconsiderable. It is with these facts in mind that the prophecy is ventured that in copper, the back-bone of British Columbia's mineral industry, 1918 is likely to make a more satisfactory showing than the preceding year.

Silver, Lead and Zinc.

It is impossible to say much at the present moment with respect to the production of silver, lead and zinc. From general information it is surmised that silver will about equal in value the 1917 figure, but lead and zinc are likely to be somewhat below the previous year.

In explanation of these statements it can only be said that operations have been affected by the high costs and the difficulty of obtaining labor. These two factors, so pronounced throughout 1918, have had their influence on mining throughout British Columbia, as they have, no doubt, on the industry in other parts of Canada. Unquestionably the greatest producer of lead and zinc in the West is the Consolidated Mining & Smelting Co. at Trail. The story of the demand for zinc in the earlier days of the war is well known. It will be remembered that the price at one time advanced to 40 cents and all mining men in this section know that the Trail smelter management, because of the need of this metal for munition purposes and because of the high prices offering, installed an electrical plant, costing some \$2,000,000, for the purpose of recovering the zinc from the fractious ores of the Kootenays. At the high prices it was profitable; but whether the plant, under conditions of the day, is proving a commercial success, is another question. In fact, the company obtained from the Dominion Government a bonus on zinc production, to be applied should the price fall below a certain figure, and, no doubt, is now receiving assistance under this legislation in order that the industry may not receive a knock-out blow and in order that valuable experiments in the treatment of the

silver-lead-zinc ores of the Eastern Districts of the province may be continued. With these circumstances in mind, and having before us the recollection of the number of zinc plants which sprung up in the United States following the great call for the metal, and remembering that this company was not exempt from the problems of costs and labor, it cannot be supposed that its production of zinc in 1918 will prove to be record-breaking.

Investigation of Smelter Costs.

While referring to the Consolidated Mining & Smelting Company, it is apropos to state that it has been, and still is, rather a storm centre, so far as the mining fraternity of the eastern part of the province is concerned. The trouble is of long standing; in fact it was the subject of debate at the last session of the British Columbia Legislature when a motion was introduced to the effect that the affairs of the company should be subjected to rigid and thorough inquiry by a Board of Investigation clothed with authority to take evidence, examine books, etc. At the time, however, the Associated Boards of Trade of Eastern British Columbia had the matter up with the Dominion Government, having appointed a committee to apply the probe and having asked that the Federal Administration support their nominees in the work financially and, so to speak, morally. This being the situation, Hon. Wm. Sloan, Minister of Mines, suggested that it would be better to defer provincial action until it was learned what the Ottawa authorities proposed to do. On behalf of the Government he agreed that, should the committee be properly authorized, he would be glad to see that the province was represented and, on the report of this representative, it could be determined whether further provincial action was necessary. Shortly after, it was learned that the Dominion Government was glad to give the aforesaid committee moral backing, but hesitated as to finances. Further pressure, however, elicited this support as well, and now the committee is prepared to proceed. The Spanish influenza interfered with plans made recently; but the inquiry, it is assured, will be started at an early date. The committee's work is to establish whether the charges made by operators in the Kootenay and Boundary Districts that the rates imposed for treatment of custom ores at the smelter are unfair and unjustified. The smelter's customers allege that schedules issued during the year leave them little or no profit and that, in many instances, small operators are driven to close down their properties. Some take the extreme view that the smelter should be taken over by the Government. The smelter management, on the other hand, maintain that the schedule allows them the smallest possible margin for treating and marketing the ore purchased and that the changes made from time to time have been rendered necessary because of increased costs and by reason of fluctuations of market quotations. They declare that an impartial investigation is welcomed.

To revert to the question of production, the record of tonnage of ore received by the Trail smelter for treatment during the first ten months of the year possible is of some significance, especially with reference to zinc and lead, and to a lesser extent in regard to gold.

Gold Mines Suffered as in Other Provinces.

Before giving the figures, a word may be said as to gold, now that it has been mentioned. That the production of the placer grounds of British Columbia will show a decline, more or less marked, cannot be doubted.

The reasons for this are the same in this province as they are in all parts of America, viz., the fixed value of gold, high costs which are conservatively estimated to have advanced 60 odd per cent. in the West, and the scarcity of labor. In the Atlin District, for instance, it is said that it was very hard to obtain workmen at any price and, incidentally, one of the largest of the hydraulicking concerns of the camp, the Columbia Mines, Ltd., was obliged to close down and its plant was sold for a song to creditors. Indubitably this was the result of the difficulties enumerated—difficulties, as has been said, which have been common in all gold-mining centres and which led to a widespread and strongly supported agitation in the United States for the institution by the Government of a policy of subsidy or bonus in order that the industry might not languish and that the production of the precious metal so necessary in the re-adjustment of the world's credits, might be stimulated.

Ore Treated at Trail.

The Trail Smelter figures mentioned show that from January to October, 1918, inclusive, 271,417 tons of ore were received as compared with 327,639 for 1917, and 415,983 for 1916 (same period); that at the end of October, 1917, there were 148 mines shipping to Trail more or less regularly while on October 31st, 1918, the total of the mines that had shipped during the year was 122; and that in October, 1918, there had reached the smelter 26,042 gross tons of ore as compared with 49,975 tons for October of the previous year. The latter parallel, however, is scarcely fair, as October of last year was an exceptional month in point of receipts. The following table of gross tonnage receipts at Trail for each of the first ten months, 1916, 1917 and 1918, is interesting at this time:

	1916.	1917.	1918.
January	26,986	36,570	27,404
February	37,863	40,967	33,989
March	43,810	42,949	41,725
April	41,771	25,909	37,029
May	43,031	15,969	21,162
June	42,252	17,129	17,956
July	40,268	20,744	20,871
August	46,814	38,134	23,465
September	42,863	39,293	21,765
October	40,350	49,975	26,042
Totals	415,983	327,639	271,417

No. 5 Mineral Survey District.

No. 5 Mineral Survey District, which includes all the eastern part of the province, is in charge of Mr. A. G. Langley, the resident engineer, with headquarters at Revelstoke, B.C. It is the operating mines of this section which contribute much the greater part of the ore for the Trail smelter. Mr. Langley, in discussing the season's work, roughly compiles the tonnages of ore sent to Trail from the several mining divisions under his supervision as follows:

	1918.	1917.
Slocan	13,097 tons	27,657 tons
Ainsworth	16,249 "	9,105 "
Slocan City	157 "	199 "
Fort Steel	81,528 "	116,324 "
Windermere	2,339 "	2,211 "
Nelson	3,934 "	8,108 "
Golden	803 "	272 "
Trail Creek	105,897 "	97,717 "

Thirty-four properties, which made small shipments in 1917, are listed as having dropped from the shipping list this year.

The resident engineer, in going into details, states that the Slocan, and especially the Sandon Camp, is enjoying more activity than has been experienced for a number of years. The closing down of the Standard Mine, he declares, is likely to result in a decrease in tonnage production in 1918 from this particular part but "other developments which are now taking place will tend to make future shipments from this district compare favorably with those of former years." On the other hand, the Ainsworth District has had a banner year and the production will greatly surpass that of the past. The same is the case with the Slocan City Division, while the Fort Steele Mining Division probably "will show an increase in gold production, on account of the recent hydraulic work and possibly a slight decrease in silver, lead and zinc." Referring to other mining divisions, he asserts that Windemere and Golden will show slight increases, that Nelson's output will be about the same as last year and that the returns from other districts will compare favorably with 1917.

Concluding, he remarks that "generally speaking, I would consider that there has been actually more prospecting done this year than last."

No. 6 Western Mineral Survey District.

Mr. Wm. Brewer, resident engineer in charge of Western Mineral Survey District, No. 6, which embraces Vancouver Island and a part of the lower mainland, mentions twenty-one properties within his purview on which new work either is in progress or is contemplated. In this district there has been one new metalliferous shipping mining property developed during the year. It is the bog iron deposit situated near Mons on the Pacific Great Eastern Ry., and is sending ore to the Irondale smelter for fluxing purposes.

North-eastern District.

In discussing mining conditions in the North-eastern District, Mr. J. D. Galloway, district engineer, observes that the scarcity and high price of labor, the high cost of mining supplies, especially powder and machinery, and the reluctance of capitalists to invest in purely speculative mining development has retarded progress during the past year. He adds, however, that there is a large virgin field in the North-eastern District for prospecting and undoubtedly when men return with the declaration of peace, prospecting, which now has practically ceased, will again be revived and many new discoveries may be made. He enumerates twelve properties on which development work is under way.

North-western District.

Mr. George Clothier, resident engineer North-western District, speaks of fifteen properties which are being opened up in the further development, in some of which plant is to be installed.

In No. 3 District, of which Kamloops City is the centre, Mr. R. W. Thompson, the resident engineer, enumerates fourteen properties on which new work is being done.

There has been considerable activity in No. 4 District, Boundary Country, of which Grand Forks may be styled the hub and over which Mr. P. B. Freeland presides as resident engineer.

Good Progress in Coal Mining Industry.

It is possible to speak of the coal production of

British Columbia during the past twelvemonth with enthusiasm and to view the future with optimism. The gross tonnage output up to the end of October was 2,204,255 tons, the results of the month of October giving the encouraging total of 217,482 tons. Place this beside the aggregate for 1917, which was 2,398,715 tons, and it will be readily seen that, with two more months to go at the time of writing, the prospects are that 1918 will show an increase over the previous year and possibly top the record of 1916, which was 2,485,580 tons. To reach the 1917 aggregate, 194,460 tons have yet to be mined. Certainly this should be achieved, providing nothing serious happens in the interim, and it would seem safe to predict that the province will show an output at least a quarter of a million tons in excess of the previous year.

This is especially gratifying as the operators throughout the province have been confronted with problems, not alone of costs and labor, but of the necessity in some instances of opening new mines to replace those that have become exhausted and to maintain the output. Mines closed down include No. 4, Extension B.C., Canadian Collieries (D) Ltd., and Nos. 1 and 2 Slopes, of the Pacific Coast Collieries, South Wellington. In the former case the Canadian Collieries immediately arranged to maintain their tonnage by opening No. 5 Mine at South Wellington, which now is in operation and making a first-class showing.

The Pacific Coast Collieries, on their part, are maintaining Nos. 3 and 4 shafts, Morden Mine, South Wellington Colliery, from which they are obtaining good results. The British Columbia Coal Mining Co., in October of 1917, had its Jingle Pot mine closed down by the inspector of mines because of an outbreak of fire. It was not re-opened until a short time ago, but now its tonnage is slowly advancing. On the other hand, the companies have had an accession to their ranks in the Granby Consolidated Mining & Smelting Company's new colliery at Cassidy's, Vancouver Island, the production of which now has reached quite a respectable total. Development work, too, has been undertaken by the old concerns.

B.C. Coal Output Statistics for the First Nine Months of 1918.

Island Fields.

	Output, 1917, Jan.-Sept. inclusive. (Tons.)	Output, 1918, Jan.-Sept. inclusive. (Tons.)
Canadian Western Fuel Co.....	472,656	563,605
Canadian Collieries (D), Ltd. (Cumberland)	387,172	419,516
Canadian Collieries (D), Ltd., (Extension)	218,223	173,429
Canadian Collieries (D), Ltd., (South Wellington, new mine)		11,951
Pacific Coast Coal Mines, Ltd. ...	120,448	70,385
B.C. Coal Mining Co.	61,065	3,673
Nanoose Colliery Co.	15,583	25,083
Granby Cons. Mining & Smelting Co. (Cassidy's)		10,195
Totals	1,275,147	1,277,847
Island increase up to end of September, 2,700 tons.		

Crowsnest Field.

	Output, 1917, Jan.-Sept. inclusive. (Tons.)	Output, 1918, Jan.-Sept. inclusive. (Tons.)
Crow's Nest Coal Co. (Coal Creek)	216,778	319,209
Crow's Nest Coal Co. (Michel)	76,054	157,290
Corbin Coal & Coke Co. (Corbin)	57,348	95,511
Totals	350,180	572,010

Crowsnest increase up to end of September, 221,830 tons.

Nicola-Princeton Field.

	Output, 1917, Jan.-Sept. inclusive. (Tons.)	Output, 1918, Jan.-Sept. inclusive. (Tons.)
Middlesboro Colliery Co. (Merritt, B.C.)	57,860	79,542
Fleming Coal Co. (Merritt)	7,439	22,451
Merritt Colliery (Merritt, not now operating)	9,345	.....
Columbia Coal Co. (Coalmont, B.C.) new mine	.....	2,985
Princeton Coal & Light Co. (Princeton)	31,544	31,688
Telkwa (new mine)	.....	150
Totals	106,158	136,816

Nicola-Princeton increase up to end of September, 30,658 tons.

Total increase in tonnage, 255,188.

The tonnage returns for the month of September showed a decline of 75,777 tons as compared with the results during August. The trouble in September was the strike at Fernie and Michel, B.C., when the mines were closed down, the men striking for a Single Shift as the only satisfactory means of adequately safeguarding the dangerous condition of the mines. The production of the Crowsnest Pass Field was seriously affected. The chart shows that the output in this section had declined steadily from the beginning of the year to the end of August, at which point it takes a decided slump, no less than 60,000 tons of coal being lost because of this difference between the miners and their employers. Whether the mines were in a dangerous condition, which condition would be improved by the Single Shift System, remains to be demonstrated by Royal Commission, it being provided under the terms of the agreement by which the mines were re-opened in accordance with the men's demands that the point indicated should be subject to inquiry on the part of such a body. The personnel of the Commission, however, has not yet been announced, but is expected to be made known very shortly. The tonnage total also was influenced during September by the fact that there were more than the usual number of off-days, there being Labor Day, five Sundays, a thirty-day month, as well as the Nanaimo accident, in which sixteen miners lost their lives when the hoisting cable in No. 1 Shaft, Protection Western Fuel Co., broke and let a descending cage crash through the heavy timbering at the bottom, carrying its passengers to a terrible death. The months of October and November have developed their particular trouble for the operators who are striving to maintain the pace set early in the year and to establish a record for 1918. It is the influenza plague. And

while there is a disposition to treat this matter lightly, its seriousness in the coal mining camps of this province cannot be questioned. The production of the Canadian Western Fuel Company, Nanaimo, B.C., for October was 59,219 tons. This is the total for 27 working days as against 61,200 tons for 25 working days in September. Compare those two figures and some idea is obtained of the ravages of the epidemic among the miners. Clearly it has reduced this company's daily results by about 300 tons, which, it will be admitted, is no inconsiderable amount in the aggregate. And from authoritative reports the same difficulty not only is being met with in other Island camps but is being experienced at present in somewhat accentuated form in the Crowsnest Field.

War Minerals.

There are two points to which attention should be directed in concluding a summary of the year's mining activity in the province of British Columbia. One is that the pressure of the war brought to light some of the minerals of which little was generally known until their necessity for munition purposes was emphasized. Most important of these is manganese, of which several most promising deposits have been located in the Cowichan District, Vancouver Island, and no doubt will be developed without loss of time. Chromite, also, has been discovered and, although nothing can be said as to the extent of the deposits, those which have been recorded in No. 4 Mineral Survey District, near Midway and on Scotty Creek, north of Ashcroft, are said to be encouraging in their indications. Then there is a very promising molybdenite property at Alice Arm; scheelite in the Cariboo District, near Barkerville; and platinum on the Tulameen River and in some placer ground of the northern country. With respect to the Tulameen placers the Dominion Government has been prospecting bed-rock at several points, using a Keystone drill for the purpose, and good results have been obtained.

Bright Outlook for Coming Year.

The second point is that the future is bright and is so considered by all identified with the industry. The catch phrase that "the mineral resources of the country have but been scratched" can be applied to this province literally and without exaggeration. Naturally, problems are constantly becoming apparent, the annual output fluctuates considerably, but the upward curve, as will be shown by a glance back over the records, has been steadily maintained. In the last few years this tendency has been more marked and it is the consensus of opinion that, with the return to normal conditions now that peace is in sight and the demands of the reconstruction period at the threshold of which we stand, the mining industry of the province is bound to come into its own.

KIRKLAND LAKE GOLD.

Considerable delay, occasioned by the shortage of labor has retarded development and construction work at the Kirkland Lake Gold property of the Beaver Consolidated Mining company. Construction work on the new head frame at the central shaft is well under way however, and the structure should be completed this month. This headframe will be 80-feet in height and when completed everything will be in readiness for the commencement of production in the new 150-ton mill, which is now being tuned up.

THE COAL TRADE OF NOVA SCOTIA IN 1918

By F. W. Gray.

The trend of the coal industry in Nova Scotia is indicated by the subjoined tabulation. The figures given for 1917 and 1918 are closely approximate, and an attempt is made to forecast the probable production of 1919. In last year's Review the writer forecasted the 1918 production as likely to be—barring accidents or stoppages of work—in the vicinity of 5,300,000 tons. A reduction of about 100,000 tons was caused by the explosion at the Allan Shaft early in the year. With the exception of a strike at the Pictou Collieries during the summer, which lasted a fortnight, there were no other notable interruptions to production.

Coal Outputs in Nova Scotia (Tons of 2,240 lbs.)

Tons	Percentage from Cape Breton Island per cent.	Percentage from Main- land Mines per cent.	Percentage of Reduction from the basis of 1913 per cent.
1913 ... 7,263,485	81½	18½	...
1914 ... 6,650,031	81½	18½	8½
1915 ... 6,709,951	82½	17½	7½
1916 ... 6,171,424	81¼	18¾	15
*1917 ... 5,667,000	77¼	22¾	22
*1918 ... 5,175,000	77¾	22¼	29
†1919 ... 5,100,000	77½	22½	30

*Approximate.

†Estimated.

The production for 1919 has become a factor of greater uncertainty because of the suspension of hostilities and the probability of a return of the soldiers to work, but it would appear probable that the decline in production will continue during the first half of 1919, and that the outputs may commence to increase by the summer, when presumably some of the soldiers formerly employed as miners will have returned to the collieries.

Some difficulties may arise whenever the soldiers commence to return in large numbers if they should apply for work at the collieries, at least so far as those men are concerned who cannot work at the production of coal at the coal-face, either because of inability or because they prefer other work around the collieries. At the present time, and throughout the greater part of the war period, the restricted production, and in a great part the increased cost of mining also, has been attributable to a shortage of skilled miners and face-workers. There are employed at the collieries a disproportionately large number of non-producers, and before any more men of this class can be employed, and indeed before the men now working in this class can be employed to their full efficiency, it will be necessary to augment the number of producers. These men are most badly needed, but they are needed in advance of any general increase of the colliery working forces, and there may be misunderstanding, or worse, when the soldiers return and apply for work at the collieries, unless this condition is thoroughly understood. If the shortage in producers can be made up, presuming a sufficient market for coal, then outputs can be increased, costs can be decreased, and employment can be given to men who otherwise will be out of work. But it should be realized that as the enlistment of men from the collieries was of a discriminating character, seeing that it was largely confined to the producing class, so must the re-employment discriminate against non-producers until the existing disproportion is remedied.

It cannot be claimed that the future of the coal industry in Nova Scotia is encouraging. Because of the operation of adverse factors, which were fully dealt with in the 1917 review, the coal operators find themselves confronted with a labor shortage, war-time wages, a permanently increased getting cost, and collieries that are either approaching exhaustion, or are incapable of producing the pre-war outputs because of the arrested condition of their underground development, brought about by a labor shortage extending now over a full three years.

The actual cost of mining coal in Nova Scotia exceeds greatly the maximum selling prices allowed by the United States Fuel Administration at the bituminous mines in that country. In some instances it costs twice as much to defray the bare outlay on wages and materials as the maximum pit-mouth selling prices just referred to. The bituminous coal production in the United States to-day is in the neighborhood of 700,000,000 tons annually, and an increase of 18 per cent. over 1917 figures has been achieved. The coal production of Nova Scotia now barely exceeds 5,000,000 tons per year, and it shows a reduction from 1917 figures of about 9 per cent.

For the first time it appears probable that Nova Scotia will fall behind Alberta in coal production, for, in the expectation of the Chief Inspector of Mines for that Province, Alberta is looking towards a production of 6,000,000 tons in 1918.

The position of the Nova Scotian coal industry has latterly been obscured by the dominance of the steel industry, because the percentage of the coal output used in steel manufacture is now so great as to have made the production of coal for domestic uses a secondary consideration. So long as the steel trade continues profitable this condition of affairs may continue, but it will eventually become plain that the coal industry itself is the basis of industrial prosperity, and the coal industry cannot be regarded as stable unless in addition to supplying the steel industry with the required fuel, it can also provide the railway, shipping, factory and domestic requirements of the accustomed distribution area of Nova Scotian bituminous coal. At the present time this is not possible, and unless the coal operators of Nova Scotia are resigned to going out of business entirely they must speedily take steps to increase the coal production, for only by increased production can the cost of extraction and marketing be reduced to figures that will permit of sales being made in competition with United States fuel, just so soon as the present coal shortage passes away.

The miners of Nova Scotia, so far as they are represented by the Amalgamated Mine Workers of N. S., have announced their intention to demand a substantial increase in wages at the end of the year, an increase which will be cumulative upon advances since 1916 totalling from 75 to 100 per cent. The miners' leaders state they wish to be paid wages on a scale as high as that of the highest paid miners on the Continent, but it is quite certain that if the miners of Nova Scotia wish to be paid the same wages as it is claimed are earned in some of the States, they will have to move to the States, because there is no blinking the fact that the extraction of coal in Nova Scotia is pursued under natural conditions that make the cost of mining much higher than in the United States, and this handicap must be accepted by all who engage in the industry. Miners' wages in Nova Scotia have reached, if they have not exceeded, the maximum burden that the economic limitations of the industry will allow.

The long-standing wage agreement between the Dominion Coal Company and its mine workers expires at the end of 1918, after having run continuously—with supplements and modifications—for a period of fourteen years. This agreement, while existing only between the Dominion Coal Company and its employees, has really dominated the wage agreements elsewhere in Nova Scotia.

In view of the critical stage at which the coal industry has arrived it is to be hoped that wise and moderate counsels will prevail in negotiating a new wage agreement, because it is to be doubted whether since the era of depression in the coal trade that paved the way for the formation of the Dominion Coal Company twenty-five years ago has the outlook of the industry been so uncertain. In fact the logic of events will eventually force the coal operators, as it did in 1893, to realize that in consolidation of interests lies the only hope of healthy survival.

SPECIAL CORRESPONDENCE

Kirkland Lake.

Interest is increasing in the southern section of the Kirkland Lake Gold Area, the chief properties in this section are the Ontario-Kirkland, Canadian-Kirkland and Hunton-Kirkland properties. Interest attaches to the Ontario-Kirkland through the fact that the company expect to have their new \$15,000 mining plant in operation by the middle of the current month, when the work of sinking the main shaft to a depth of 300 feet will be proceeded with at once.

Mr. D. Angus, of the Right of Way Mines, Cobalt, and Mr. George E. Drummond, of Montreal, are understood to be negotiating for purchase of control of the Canadian Kirkland, which is located a short distance south of the Kirkland Lake Gold property, and to the west of the Ontario-Kirkland. The Canadian-Kirkland occupies a leading place among the undeveloped properties of the Kirkland Lake Camp. A number of large well-mineralized veins have been opened up with the limited amount of development work already done. Two of these veins have been found to contain free gold and the assays as a result of careful sampling show a very encouraging grade of ore. The geology of the property is exceedingly favorable for the deposition of commercial ore bodies.

Negotiations involving purchase of control of the Hunton-Kirkland are also under way. Exceedingly rich specimens of gold ore were taken from the Hunton-Kirkland property in the early days of the camp from the surface workings. Just prior to the outbreak of war, the property became involved in a deal with English interests.

Lightning River

The case heard recently before Mining Commissioner T. E. Godson, K.C., regarding the claims in the Lightning River district known as the Howie Cochenour has been dismissed. Mr. R. N. Austin entered claim against W. M. Cochenour, L. B. Howey, M. R. Howey and George F. Martin for an interest in the claims above referred to, but the claim was disallowed. Work at the property has been suspended for the time being at least, owing, it is said, to the difficulties and high cost of transportation. It is understood that while good encouragement has been met with, the cost of operation has led to the discontinuing of the work. It required about four days for a team of horses to

make the road trip from the railway to the mine with about half a ton of supplies. Whether or not plans are being made for a resumption of work at some later date has not been announced.

Hollinger Makes New Record.

It is evident the output of the Hollinger-Consolidated for the year 1918 will exceed \$6,250,000. This entirely eclipses any previous records of the company and is the greatest yearly production from any precious metal mine in the Dominion of Canada. This is all the more remarkable when the prevailing conditions regarding gold mining in general are taken into consideration, scarcity of labor and high cost of materials of all kinds. The Hollinger has been operating with but about half the men required and utilizing about half of their large milling equipment. During the year several miles of new underground work has been done, during the course of which a number of large and important ore bodies have been added to those previously known and a large amount has no doubt also been added to the already huge ore reserves. The 425 foot level continues to constitute the main source of ore supply. The property is developed in such a manner as to permit of great economy in mining. All levels above the 425-foot might be termed auxiliary levels, as all the ore from these workings finds its way through various passes to the main haulage way where it is loaded onto cars and conveyed by electric power to the main shaft and hoisted to the mill for treatment. Not far under 1,500 tons of ore are hoisted at the property every twenty-four hours or approximately 45,000 tons per month. Under normal conditions and working the property to full capacity the amount of ore hoisted annually will probably be about 1,000,000 tons. It is estimated that the monthly output of the mine has been around \$520,000 with a net profit of about not far under \$300,000, for at least a few of the twelve months. It will probably be some little time after the close of the year before the official statement of the company will be available and the result of operations in detail made known. However, from a careful study of the statistics available it is expected that the net earnings of the company will be about three million dollars or equal to about 11 per cent. on the issued capital.

With the prospects of sufficient labor to operate at capacity early in the new year, it would appear that 1919 has great possibilities of showing an even greater production.

To Drill O'Donald Claims.

Arrangements are said to have been completed for the commencement of a diamond drilling campaign on the O'Donald claims at Boston Creek. The full extent of the work planned has not been made known yet. The O'Donald claims have been under option to various interest since the commencement of development of the Boston Creek area, and are said to have much merit. They are well located and should benefit materially from work being done on properties in the immediate neighborhood.

Tellurides on Campbell Claims, Catherine Township.

Very satisfactory results are attending development work on the Campbell claims in Catherine township near the Miller-Independence. The claims are situated in a direct line with what is considered to be the strike of the main vein of the Miller-Independence. One strong vein opened up on the property contains tellurides as well as visible gold. The property is owned by Duncan Campbell of Haileybury.

Cane Silver.

Trouble appears to be brewing for the Cane Silver Mines, Limited, with property situated in the township of Cane, near Kenebeck Station, on the Elk Lake branch of the T. & N. O. railway. In 1913 the property was optioned to Col. D. B. Shepp, of Philadelphia, at which time considerable surface exploration was done and a shaft sunk to a depth of 50 feet. While a good deal of encouragement was met with, the ore deposition was found to be erratic and the option was allowed to expire. Since that time various interests have had the property under exploration, but without success in the finding of silver ore in commercial quantities. The Trethewey Company of Cobalt held an option on the property for a short time recently, but decided not to exercise it. Toronto interests later organized a company known as the Cane Silver Mines Company, to operate the property. It now transpires that the latter company propose granting a ten-year option on the property with the privilege of renewal for a like period to other interests. The original owners of the property, who are Elk Lake men, appear to be opposed to such action and reports state that they are preparing to endeavor to prevent the consummation of such an agreement.

Silver was first discovered in this part of the township of Cane in the spring of 1913. The most consistent effort to develop the property was while under lease to Col. Shepp, since which time operations have never been continued for more than a few weeks at a time. One large aplite vein was opened up on the surface; in which leaf silver was to be seen, while a number of narrow veins carried spectacular samples of native silver.

Paragon-Hitchcock.

One machine and one shift of men is engaged in development work at the Paragon-Hitchcock property near Elk Lake. Since October 1st about 130-feet of lateral work has been done at the 100-foot level. Results met with are said to have been promising.

Plans are said to be under way for the resumption of operations at the property of the Moosehorn Mines. It is announced that endeavors are being made to secure the necessary capital to commence work again in February. In the early days of the Elk Lake boom, two or three shipments of high-grade ore were made from this property. Work at this time was confined principally to surface exploration, no effort being made to work the claims at depth.

Foster Mine.

From present indications the ore shoot encountered

some time ago at the Foster property will produce about one car-load of high grade ore. The ore is exceptionally rich and will make up a very valuable consignment. At the time of writing the high grade has disappeared from the vein in the face of the drift. The working however is being continued with the expectation of encountering a recurrence of the rich deposit. The vein is showing in the roof and floor of the drift, and a good deal of ore still remains in place.

MARKETS

Messrs. J. P. Bickell & Co. report the following quotations of the Standard Stock & Mining Exchange, at the close of business, December 10th, 1918:

<i>Gold.</i>	Bid.	Asked.
Apex .....	.03 3/4	.04
Boston Creek .....	..	.34
Dome Extension .....	.26 1/4	26 1/2
Dome Lake .....	.18	..
Dome Mines	12.00	12.90
Imperial .....	.02 1/4	.02 1/2
McIntyre	1.73	1.74
Hollinger	6.25	6.30
Newray .....	.15 1/2	.17
Porcupine Crown .....	.24 1/2	.25
Vipond .....	.22 1/4	.25
Preston .....	.03 1/2	.04
Teck-Hughes .....	.32	.34
West Dome .....	.14	.15
<i>Silver.</i>		
Adanac .....	.09	.09 1/2
Bailey .....	.05	.04 1/4
Beaver .....	.38	.39
Ferfand .....	.10 1/2	.12 1/2
Coniagar .....	..	3.35
Crown Reserve .....	.22	.23
Foster .....	.03 1/2	.04
Gifford .....	.03 1/8	.03 1/4
Great Northern .....	.03	.04
Hargraves .....	.02 1/2	.03
Hudson Bay	23.00	..
Kerr Lake .....	..	5.90
La Rose .....	.33	.35
McKinley .....	.45	..
Peterson Lake .....	.09	.09 1/2
Temiskaming30 1/4	.31
Tretheway20	..
Wettlaufer04 1/2	..
Mining Corp.	2.20	2.40
Ophir04	.04 1/4

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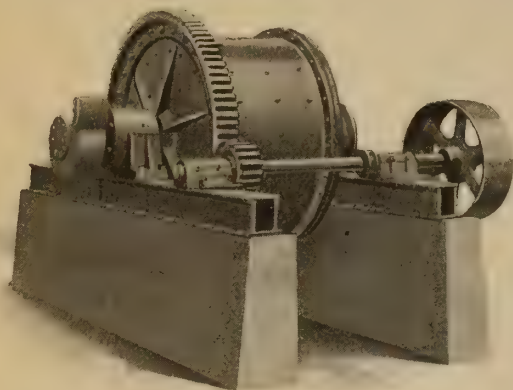
Harry P. Corliss.

Dr. Harry P. Corliss, Chemical and Metallurgical Engineer with the Metals Recovery Company, died on November 16th, at the age of thirty-two years, at Ray, Arizona. His death was the result of pneumonia following influenza.

In 1910 Dr. Corliss received the degree of Bachelor of Science in Chemical Engineering at New Hampshire State College. He then continued his studies at the University of Toronto for two years, specializing in physical and organic chemistry. At the end of this time he accepted a position as Industrial Fellow in the Mellon Institute of Industrial Research, Pittsburgh, Pa. In 1913 he received the degree of Doctor of Philosophy at the University of Pittsburgh.

Dr. Corliss' work at the Mellon Institute extended over a period of five years. During most of this time he was engaged in research upon metallurgical problems. The research resulted in several important improvements upon the flotation process for the recovery of minerals. Perhaps his most notable contribution to this industry was his discovery of alpha-naphthylamine as a flotation agent. It is too early as yet to estimate the full value of the discovery to the metallurgical world, but the results already obtained with it justify the belief that Dr. Corliss' work will one day be recognized as being of first importance in this field.

In 1917 he accepted a position with the Metals Recovery Company in order to initiate the large-scale application of his discoveries. In this work he was uniformly successful and was rapidly making for himself an enviable reputation as a metallurgical engineer when death called him.



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PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORE MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

Coal Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

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Government core-drills can be had from the department for boring operations.

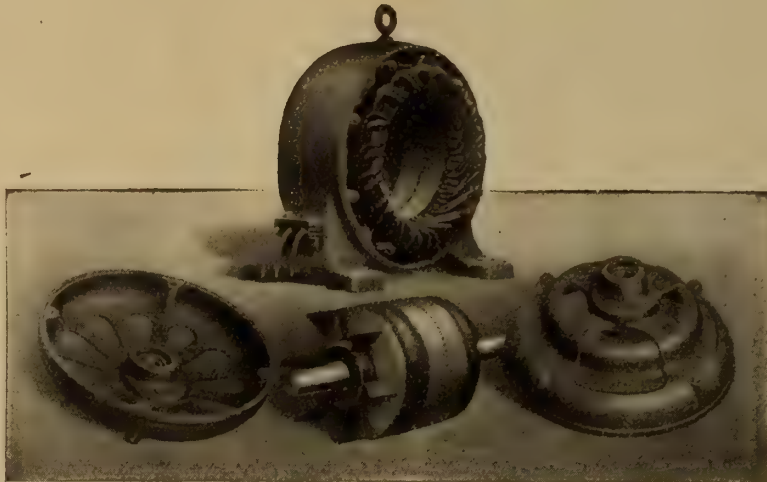
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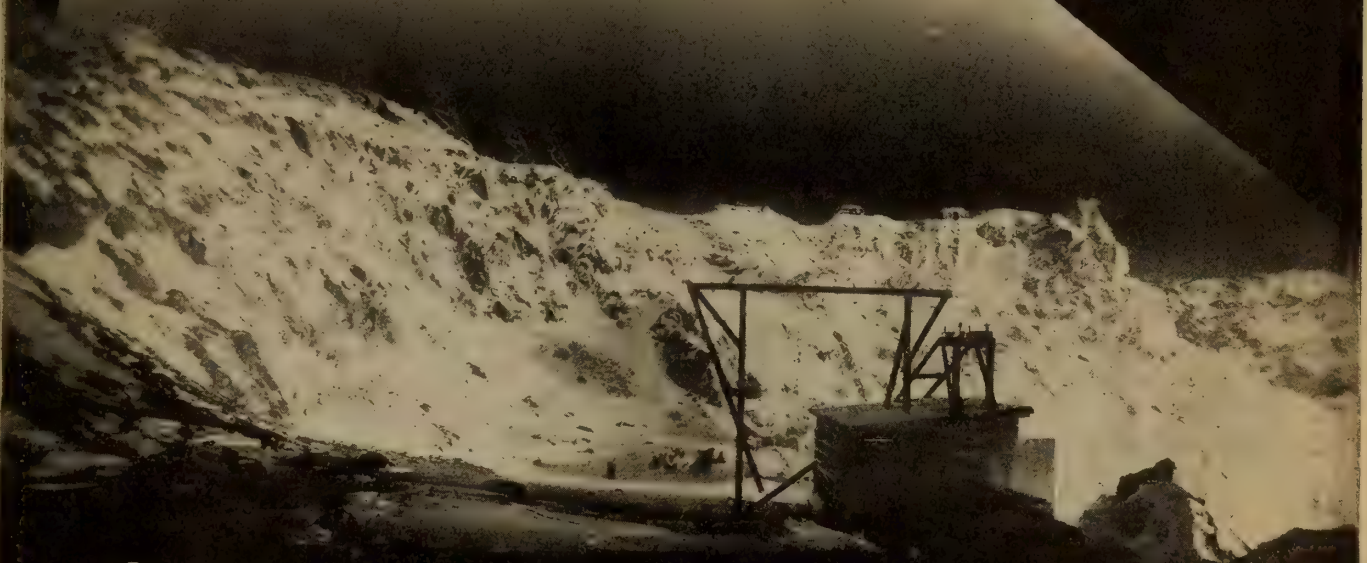
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- Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.
- Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Mineral Production Reports, by J. McLeish, B.A.
- The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.
- Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.
- Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.
- Summary Report of the Mines Branch, 1916.
- The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.
- The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—
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- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

- Summary Report, 1917, Part D. Reports on field work in Manitoba.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Memoir 99. Road material surveys in 1915, by L. Reinecke.
- Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.
- Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.
- Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.
- Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.
- Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.
- Map 135A. Lower Churchill river, Manitoba. Geology.
- Map 145A. Timiskaming county, Quebec. Geology.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.
- Map 165A. Windermere, Kooteney district, B.C. Topography.
- Map 174A. Blairmore, Alberta. Topography.
- Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.
- Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.
- Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missongia, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.
- Map 1690. Whiteburn Gold District, N.S. Geology.
- Map 1702. Klotassin, Yukon Territory. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
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Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
Standard Diamond Drill Co.
Sullivan Machinery Co.
- Drills—Diamond—**
Sullivan Machinery Co.
Northern Canada Supply Co.
- Drill Steel—Mining—**
Hadfields Ltd.
- Drill Steel Sharpeners—**
Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.
- Drills—Electric—**
Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
Sullivan Machinery Co.
- Drills—High Speed and Car-
bon—**
Hadfields Ltd.
- Dynamite—**
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors—**
Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
Northern Canada Supply Co.
- Elevators—**
M. Beatty & Sons.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields Ltd.
- Engineering Instruments—**
C. L. Berger & Sons.
- Engines—Automatic—**
Smart-Turner Machine Co.
- Engines—Gas and Gasoline—**
Alex. Fleck.
Sullivan Machinery Co.
Smart-Turner Machine Co.
Gould, Shapley & Muir Co.,
Ltd.
- Engines—Haulage—**
Canadian Ingersoll-Rand Co.
Ltd., Montreal, Que.
Marsh Engineering Works.
- Engines—Marine—**
Smart-Turner Machine Co.
- Engines—Steam—**
Smart-Turner Machine Co.
M. Beatty & Sons.
- Forges—**
Northern Canada Supply Co.,
Ltd.
- Forging—**
M. Beatty & Sons.
Smart Turner Machine Co.
Hadfields Ltd.
- Furnaces—Assay—**
Lymans, Ltd.
Mine & Smelter Supply Co.
- Fuse—**
Canadian Explosives.
Northern Canada Supply Co.
- Gears—**
Smart-Turner Machine Co.
Northern Canada Supply Co.
- Hammer Rock Drills—**
Mussens, Limited.
- Hangers—Cable—**
Standard Underground Cable
Co. of Canada, Ltd.
- High Speed Steel—**
Hadfields Ltd.
- High Speed Steel Twist Drills**
Northern Canada Supply Co.
- Hoists—Air, Electric and
Steam—**
Can. Ingersoll-Rand Co.,
Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh Engineering Works.
Northern Canada Supply Co.
- Hoisting Engines—**
Mussens, Limited.
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Marsh Engineering Works.
- Hose—**
Northern Canada Supply Co.
- Hydraulic Machinery—**
Hadfields Ltd.
- Ingot Copper—**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds—**
Standard Underground Cable
Co. of Canada, Ltd.
- Jacks—**
Can. Ingersoll-Rand Co.,
Ltd., Montreal, Que.
Northern Canada Supply Co.
- Laboratory Machinery—**
Mine & Smelter Supply Co.
- Locomotives (Steam, Com-
pressed Air and Storage
Steam)—**
H. K. Porter Company.
- Link Belt—**
Northern Canada Supply Co.
Jones & Glassco.
- Manganese Steel—**
Hadfields Ltd.
- Metal Merchants—**
Henry Bath & Son.
Geo. G. Blackwell, Sons --
Co.
Consolidated Mining and
Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Mining Requisites—**
Hadfields Ltd.
- Monel Metal—**
International Nickel Co.
- Nickel—**
International Nickel Co.
- Ore Sacks—**
Northern Canada Supply Co.
- Ore Testing Works—**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
Hoyt Metal Co.
- Ores and Metals—Buyers and
Sellers of—**
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and
Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
- Perforated Metals—**
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin—**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead—**
Canada Metal Co., Ltd.
Hoyt Metal Co.

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Pipe—Wood Stave— Pacific Coast Pipe Co., Ltd.	Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Smart-Turner Machine Co.	Separators— Smart-Turner Machine Co.	Tanks (water) and Steel Towers— Gould, Shapley & Muir Co., Ltd.
Piston Rock Drills— Mussens, Limited.	Pumps—Turbine— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd.	Sheet Lead— Canada Metal Co., Ltd.	Tramway Points and Crossings— Hadfields Ltd.
Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco.	Pumps—Vacuum— Smart-Turner Machine Co.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Mine & Smelter Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Hadfields Ltd.	Shovels—Steam— M. Beatty & Sons.	Tubs— Hadfields Ltd.
Pulleys, Shafting and Hangings— Northern Canada Supply Co.	Rails— Hadfields Ltd.	Smoke Stacks— Hendrick Mfg. Co. MacKinnon, Holmes & Co. Marsh Engineering Works.	Welding Rod and Flux— Imperial Brass Mfg. Co.
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Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Steel Castings— Hadfields Ltd.	Wheels and Axles— Hadfields Ltd.
Pumps—Centrifugal— Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Mine & Smelter Supply Co.	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co.	Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Marsh Engineering Works.
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Pumps—Sand and Slime— Mine & Smelter Supply Co.	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son. Mine & Smelter Supply Co.	Steel—Tool— N. S. Steel & Coal Co. Hadfields Ltd.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
	Screens— Northern Canada Supply Co. Hendrick Mfg. Co. Hadfields Ltd.	Stone Breakers— Hadfields Ltd.	Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.
		Surveying Instruments— C. L. Berger.	
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